MODEL AIRPLANE NEWS

SEPTEMBER 1956—35 CENTS

Contest Calendar

Enter or visit these meetings during your vacation. Talk shop with fellow hobbyists.

AUGUST

11-12—*Wichita, Kans.:* Class AAA 3rd Annual Wichita Radio Control Club Meet for RC. R. E. Etherington, C.D., 926 N. Pinecrest, Wichita 6, Kans.

12—*DeKalb, Ill.:* Class AAA Flying Circus for FFG, OR and RC. Dutch Hess and Dale Hindenburg, C.D.'s, 137½ E. Lincoln, DeKalb, Ill.

12—*Winfield, Kans.:* Class AA "Y" Wichihawks' 4th Annual Free Flight Meet for FFG, OR, TLG and OHLG. R. Ray Combs, Jr., C.D., 8326 E. Gilbert, Wichita, Kans.

12—*Johnsville, Pa.:* Class AAA Bucks County Federation of Model Airplane Clubs Contest for PL, FFG, OHLG, TLG, OR, TR, NC, CLS and CLC. Tony Becker, C.D., 2212 Griffith St., Philadelphia 15, Pa.

12—*W. Palm Beach, Fla.:* Class AA Palm Beach Spindizzies' Model Airplane Meet for rat racing and CLC. Albert C. Bursey, C.D., 3024 Clyde Rd., W. Palm Beach, Florida.

12—*Alliance, O.:* Class AA Alliance Exchange Club Model Contest for FFG, CLFS, CLS, and RC. Edward P. Gross, C.D., 23 E. State St., Alliance, O.

12—*Dallas, Tex.:* Class AA Cliff Model Club 3rd Quarterly Contest for FFG and OHLG. Joel B. Hargis, C.D., 1102 W. Saner Ave., Dallas, Tex.

12—*Waterbury, Conn.:* Class AA Waterbury Model Meet for CLS, CLC and jalopy racing. John C. McKee, C.D., 374 Knollwood Circle, Waterbury, Conn.

12—*Milan, Mich.:* Class AA Milan Second Annual Model Plane Meet for FFG, CLS, CLC and RC. David R. Maricle, C.D., 148 W. Main, Milan, Mich.

12—*Borger, Tex.:* Class AA Tri-City Model Club Meet for OHLG, FFG, and CLC. Robert W. Parsons, C.D., 1103½ W. Monroe, Borger, Tex.

17-19—*Detroit, Mich.:* Class AAA Great Lakes Radio Control Meet. E. S. Kratzet, C.D., Box 5197, Grosse Pointe 36, Mich.

17-19—*Atlanta, Ga.:* Class AAA Greater Southeastern Model Airplane Meet for CL, CLS, NC, RC, FFG, CLC, CLFS, TR, OHLG, TLG, OR and rat racing. Lloyd Wason, C.D., 315 Church St., Decatur, Ga.

18—*Union, N.J.:* Class AA Union Model Airplane Invitational Meet for CLS, CL, CLC, beauty, TR and NC. Adam J. Karp, C.D., 625 18th Ave., Newark, N.J.

18-19—*Omaha, Nebr.:* Class AA Second Annual OmaHawks' R/C Contest for RC. Robert A. Johnson, C.D., 4326 North 52nd St., Apt. 2, Omaha, Nebr.

18-19—*Burlington, N.C.:* Class AAA First Annual Radio Control League of North Carolina Radio Control Contest. Warren H. Hall, C.D., Box 1661 Burlington, N.C.

19—*Hempstead, N.Y.:* Class AA First Annual Nassau Police Boy's Club Model Contest for CL, TR, NC, CLC, CLS, CLFS and PAA Control Line Endurance. Arthur F. Wardell, C.D., 2 Hunt Pl., Bethpage, N.Y.

19—*Manitowoc, Wisc.:* Class AA Air Pirates' 4th Annual Meet for CLS, CLC, CLFS and CL. Robert F. Maciejewski, C.D., 120 Cleveland Ave., Manitowoc, Wisc.

19—*Kokomo, Ind.:* Class AAA North Central Indiana Control Line Championships for CLC, CLFS, CL and CLS. Joe Braun, C.D. 1603 Haynes Ave., Kokomo, Ind.

19—*Inglewood, Calif.:* Class AA Skywolves' Rat Race. Don C. Crystal, C.D., 805 E. Palmer Ave., Compton, Calif.

19—*Peoria, Ill.:* Class AA Illinois Valley U-Control Championships for CLS, TR, CLC, CLFS, CL, balloon bursting and R.C. Morgan Baldridge, C.D., 418 S. Adams St., Peoria, Ill.

19—*Albany, N.Y.:* Class AA First Annual Albany Flying Modelairs Meet for CLS, CLC, CLFS, CL and beauty. Albert L. Hurd, C.D., 39 Dove St., Albany, N.Y.

19—*Endicott, N.Y.:* Class AA 1st Annual Aeroguidance Society R/C Meet. Richard C. Allen, C.D., 639 Elm St., Endicott, N.Y.

25-26—*Des Plaines, Ill.:* Class AAA 1956 Illinois State Jaycee Gas Model Airplane Meet. Restricted to residents of Illinois. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29, Ill.

25-26—*Amarillo, Tex.:* Class AAA Second Annual Jaycee Model Contest for CL, rat racing, CLS, CLC, FFFS, CLFS, static scale, FFG, OHLG, TLG, RC and PL. James F. Pierce, C.D., 2607 W. 22nd St., Amarillo, Tex.

25-26—*Bristol, Pa.:* Class AA 3rd Annual Eastern States Hydro Championships for RC, CLS, NC (all R.O.W.) and model boats. Albert E. Abrams, Jr., C.D., 1031 Pond St., Bristol, Pa.

26—*Cordova, Ill.:* Class AA Third Annual R.I.M.A.C. Free Flite Contest for FFG, OHLG, TLG and OR. John J. Murphy, C.D., 4105 14th Ave., Rock Island, Ill.

26—*Fresno, Calif.:* Fresno Gas Model Record Trials for FFG. Jim Scheidt, C.D., 2225 Brown, Fresno, Calif.

26—*Cleveland, O.:* Class AA 9th Annual ½A Free Flight Contest. John W. Grega, C.D., 355 Grand Blvd., Bedford, O.

26—*Detroit, Mich.:* Class AA 10th Annual Model Plane Contest for CL, CLFS, CLS and CLC. Warren E. Bartlett, C.D., 14515 Asbury Park, Detroit 27, Mich.

26—*Waynesboro, Pa.:* Class AA Pennsylvania State Approved Junior Championships for OHLG, ½A FFG, CLC and OR. Restricted to Junior flyers of Pennsylvania. Bernard Kessler, C.D., 18 Mulberry St., Waynesboro, Pa. Pending.

26—*Clearwater, Fla.:* Class AA 2nd Annual Central Pinellas Exchange Club Contest for CLC, CLS, CLFS and CL. Claude J. Rinehart, C.D., 711 2nd St., S.W., Largo, Fla.

26—*Beverly, Mass.:* Class AA Third Annual New England R/C Championships. John K. Ross, C.D. For info: Les Wilson, 1 Short St., Bedford, Mass.

26—*White Plains, N.Y.:* Class AA Exchange Club's Annual Model Aviation Meet for ½A FFG, RC, CLC, CLS, OR and OHLG. A. E. Lehmberg, C.D., North Salem Rd., Ridgefield, Conn.

26—*Marion, Ill.:* Class AA 13th Marion Lions Club Model Airplane Meet for FFG, OR, TLG, RC, CLS and CLC. Edward H. Aikman, C.D., 1020 N. Market St., Marion, Ill.

26—*Los Angeles, Calif.:* Class AA 7th Annual Inglewood Flightmasters' Free Flight Scale Contest. Robert E. Moncrieff, C.D., 2108 Santa Fe Ave., Torrance, Calif

26—*South Bend, Ind.:* Class AA South Bend Buzz Bugs and Exchange Club Meet for FFG, OR, OHLG and RC. Jack W. Greene, C.D., 1143 E. LaSalle, So. Bend 17, Ind.

26—*Kansas City, Mo.:* Class AAA Flying Fools' 4th Annual Control Line Meet for CL, CLS and CLC. Peter W. Asjes, C.D., 5313 Ralston, Kansas City 29, Mo.

SEPTEMBER

1—*Brooklyn, N.Y.:* Class AAA 11th Annual Mirror Model Flying Fair for CL, FFG, PL, CC, RC, CLC, CLS, novelty, TR, NC, beauty-scale and non-scale beauty. Restricted to first 1000 entrants. Ted Clodius, C.D., 235 East 45th St., New York 17, N.Y.

1-2—*Tulsa, Okla.:* Class AAA 7th Annual Glue Dobbers' Free Flight Contest for FFG, OHLG, TLG, OR, FFFS, PL and RC. Willard H. Kehr, C.D., 4940 N. Johnstown, Tulsa 6, Okla.

1-2—*Houston, Tex.:* Class AAA Houston Junior Chamber of Commerce Radio Control Contest. Paul I. Brown, C.D., 3023 Durwood St., Houston, 16, Tex.

2-3—*Miami, Fla.:* Class AA 4th Annual Hurricane Meet for ½A FFG, TLG, proto speed, OHLG, rat racing, CLC and RC. Robert J. Henning, C.D., 480 N.W. 135th St., Miami 50, Fla.

2-3—*Marysville, Calif.:* Class AAA 7th Annual Marysville Exchange Club Free Flight Contest for FFG, TLG, PL and RC. Robert P. Fizer, C.D., 1132 LaCasa Ave., Yuba City, Calif.

2-3—*Arlington, Wash.:* Class AA Seattle Radio Aero Club 3rd Annual Radio Control Meet. August Kerzie, C.D., 6733 13th, N.W., Seattle 7, Wash.

2-3—*Caribou, Maine.* Class AAA Maine State Meet for ½A FFG, OHLG, CLC, CLS, TLG, B CL and Scale. Restricted to residents of Maine. Ludger Blanchette, C.D., 12 Patten St., Caribou, Maine.

3—*Far Hills, N.J.:* Class AA Model Air Meet for CL, beauty, TR and CLC. C. Marsden Vanderwaart, C.D., Lamington Rd., Bedminster, N.J.

9—*Perth Amboy, N.J.:* Class AAA 5th Annual Flying Olympics for CL, CLS, CLC and beauty. Adam Ginda, Jr., C.D., 21 Omaha Dr., Cranford, N.J.

9—*Arcadia, Calif.:* Class AA Team Racing Contest. Les McBrayer, C.D., 101-B Elm St., Alhambra, Calif.

9—*Harvey, Ill.:* Class A R/C[3] Flying Meet for RC. Restricted to members of the Radio Control Club of Chicago. R. E. Webb, C.D., 1621 E. 87th St., Chicago, Ill.

9—*Lakehurst, N.J.:* Indoor Record Trials for all indoor classes. Anthony J. Becker, Jr., C.D., 2212 Griffith St., Philadelphia 15, Pa.

9—*Chicago, Ill.:* Class AAA 13th Annual Midwestern States Championships for FFG, OHLG, OR, TLG and RC. Peter J. Sotich, C.D., 3851 W. 62nd Pl., Chicago 29, Ill.

9—*Gloversville, N.Y.:* 2nd Fulton County Annual Model Airplane Meet. For info: B. W. Morse, 8 West Fulton St., Gloversville, N.Y. Pending.

9—*Bridgeport, Conn.:* Class AA Bridgeport Aeronuts R/C Event. Phillip D'Ostilio, C.D., 47 Cardinal St., Fairfield, Conn.

9—*Pittsfield, Mass.:* Class AA 5th Annual Berkshire County Model Airplane Meet for TR, CLS and CLC. Robert L. Elliott, C.D., P.O. Box 278, Pittsfield, Mass.

(Editor's Note—Due to space limitations contest entries are limited to the next 5 weeks.)

24 HRS. 15 MIN. in the air!

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Previous Record Shattered by More Than 5 Hours!

Here are the statistics:

Date: **May 5th—12:50 A.M. to May 6th—1:05 A.M.**
Location: **U. L. Light Jr. High School Football Field, Barberton, Ohio**
Pilots: **Duane Sanders and Bob Bell**
Plane: **Slightly modified deBolt Live Wire Cruiser**
Engine: **Veco ".35"**
Propeller: **Top Flite**
Fuel: **Special Veco formula**
Finish: **Pactra Aero Gloss**
Elapsed Time: **24 Hours, 15 Minutes**
Mileage Flown: **Approx. 720 miles**
Average Flight Speed: **35 Miles Per Hour**
Time at Controls: **Pilots exchanged every half hour; no arm supports used**
Fuel Consumed: **8 gallons**
Pilot's Fuel Consumption: **2 quarts of coffee and 2 foot-long Hot Dogs!**
Gallery: **Average of 10 spectators present during entire flight**

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27th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

SEPTEMBER, 1956 Vol. LV—No. 3

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by William Winter

► How to begin an article, or a column, is a mental block for any writer. The pros say start writing, anything, then axe it later. The unwary get into pages of purty words that the editor cans, saying, let's begin it here on page three. Some Latin scholar told us Julius Caesar had it down pat. When an enemy named Orgetorix had an overrun, Julius began simply: "Orgetorix is dead." So pondering the white hot debate over free flight—still in a rut in our book—and such weighty things as Doc Hauck, out in California, who complained of a pain in his leg only to find that the pins he had pushed through the bottom of his airplane had attached said airplane to Doc, had a phone call from Bill Dean who, these days, is giving his all to Jetco models.

Pushing a pen at four a.m.—modeling is such fun—and listening to one of those all-night programs, Bill was prompted by a remark about a Nieuport 28 to give the guy an argument on the phone. For the next 45 minutes, milkmen and hamburger slingers were treated to an amazing discussion of World War 1 crates, models, and Model Airplane News covers. But as the nasty editor would say, let's begin it here. . . .

• • •

► If there is anything that the free flight argument has proved, it is that no one will ever win the debate, although the skyrocket boys' attitude that possession of the rules is nine-tenths of the law, is the telling factor. From the Brooklyn Skyscrapers, a brief, signed by a half dozen members, who, having a tougher flying site problem than most people, still like present rules.

"Raising the power loadings," says the Skyscrapers, "defeats the two stated aims of reducing the emphasis on 'glow plug skyrockets' (As Schoenky calls them), and minimizing the effectiveness of thermals.

"Higher power engines are more necessary as more weight must be lifted in the same time and, heavier weights will cause modelers to build larger airplanes. Wing loadings will stay substantially the same and thermals will have larger, more efficient wings to work on."

Because it is always good for one section to understand the other section's problems—for easterners are not necessarily subway riders as Alberts called them, let's hear out Bill Dunwoody, the Skyscraper's spokesman.

"References have been made to the effect that (*Continued on page 7*)

NEXT MONTH'S COVER

Vought Crusader

PLANE ON THE COVER

In this Mach 2 age, it is hard to believe that crates like the Sopwith Triplane existed, yet only 40 years ago this was one of Britain's WW 1 fighters. In squadron service with the Royal Navy, it was well liked. The Sopwith preceded the German Fokker Triplane. About 26½ ft. in span, it had a 130 hp motor, did 116 mph.

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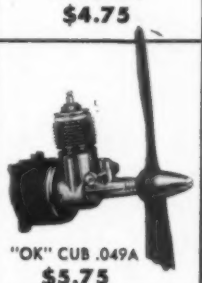

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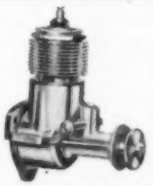

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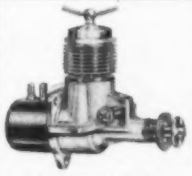

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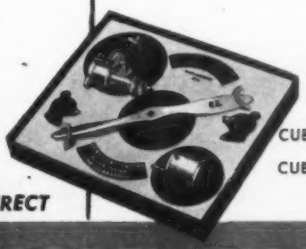

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Piper Trainer 18" .049 to .074	1.69
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Man At Work

(*Continued from page 4*)

contest modelers in the northeast are in favor of the drastic rules changes proposed," begins Dunwoody. "As an active contest modeler (control line and indoors as well as free flight events), I wish to voice an emphatic repudiation of these charges. We are not in favor of higher power loadings and know no other contest modelers who are. If eastern modelers are responsible for these suggestions, it isn't the active contest modelers who are making all the noise; conceivably it might be those modelers who are unable to meet present competitive standards.

"Much has been said of ties caused by thermal flights," Dunwoody winds up, "but here in the northeast, where small fields necessitate maximum limits of four minutes (making a maximum easier to obtain) very few ties occur. Raising the power loadings isn't going to help matters."

One thing interesting about loading arguments is that everyone agrees a bigger airplane will result, hence disaster. Perhaps it is a novel thought to consider the bigger airplane first, such as a Cumulus with a .19. It wouldn't help if it had an .09? Will someone try one on a K & B .09 and report results with this 100% increase in power loadings?

• • •

► Another thing that can stand repudiation is the familiar smug attitude that those who do not like the status quo are not good builders. Now, let's hear from one of the "bad" modelers, Chuck Wood, out of Seattle. Chuck feels alarmed that model flying is undergoing a rapid change, with the possibility that, if we don't keep the youngsters interested, we shall be doddering about at the age of 75 competing against ourselves. The statistical breakdown of the biggest meet in the Northwest last year showed 67 open class contestants out of a total of 126. There were 31 juniors. "Why are we failing to attract younger builders?" asks Chuck.

"Several possibilities come to mind," he begins, answering himself. "One—free flight is getting as stale as yesterday's newspaper. I know this will curl Don Albert's hair but, nevertheless, it is true.

"To win a free flight contest you need (a) an airplane, (b) an engine, (c) foot work necessary to retrieve the model and (d) the strength to hold out your little hot hand to take the trophy. If you lose your first model (which is quite probable)," Chuck warms up, "you then need—another airplane! The skill and knowledge to design and trim a good free flight has been largely done for us by the Goldberg's, Enticknaps, et al, and all we have to do is cash in on the background.

"In the thirties, it was a challenge to get a model to fly at all. What does a youngster do today? He buys a good kit and a good engine and, if he can start the engine and read the trimming instructions, he can lose the model on his first flight. What challenge, or accomplishment, is there in that?

"No doubt I will be classified as one who is unable to build a light model and wishes to legislate himself into the winner's circle, but I've been in the winner's circle many times," states Wood, "and find it a hollow victory when little Beezlebub next door can do the same thing by looking around for the next thermal. I'm not mad because he's one-third my age and I don't care if he builds his model with old glue tubes—it would only weigh a couple of ounces more and a good thermal will still take it out of sight.

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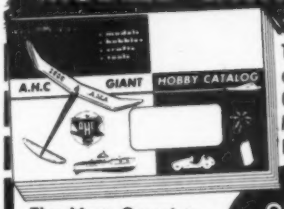

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"It takes skill to make a modern gas-powered free flight win a contest? About as much skill or development as it does to open a box and bolt on the engine!"

Wood favors drastically increasing wing loadings, saying the northwest is running out of flying space. Heavier models will stick around longer and need less room doing it. Smaller fields closer to home would be used more by kids (it takes an 80 mile round trip to fly, thereabouts). Encourage small rubber-powered models that can be flown in parks and on school grounds. (Did you ever fly a Half A in a block square park?) He wants to encourage the building of more difficult types of models to give the ardent fan something to shoot for. Keep the three international events but make the models heavier. The present five three-minute flights is an endurance contest for builders, not airplanes. So speaks Wood, winding up with the admonition, "Let's not get our contest flying down to the point of a few modelers chasing around the field screaming, "Get a car, it went thataway.

"If that is 'sport,' I'm for marbles," sez he.

Chuck's remarks about more complex models raise the question: Will people build them? The Skyscraper's "brief" went on to state that contest builders have little interest in free flight scale, helicopters, and so on, which is born out by the entrant's list breakdown at any contest. This is quite true. But is it more accurate to ask if the man who wants a heavier plane can build a light one, than it is to query the typical free flighter's ability to make and fly a flying scale or a helicopter? Does this water down the hobby to the level of

(*Continued on page 40*)

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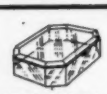

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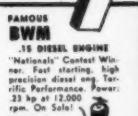

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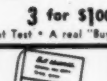

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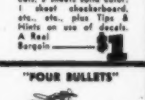

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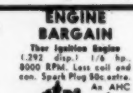

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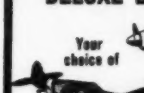

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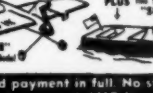

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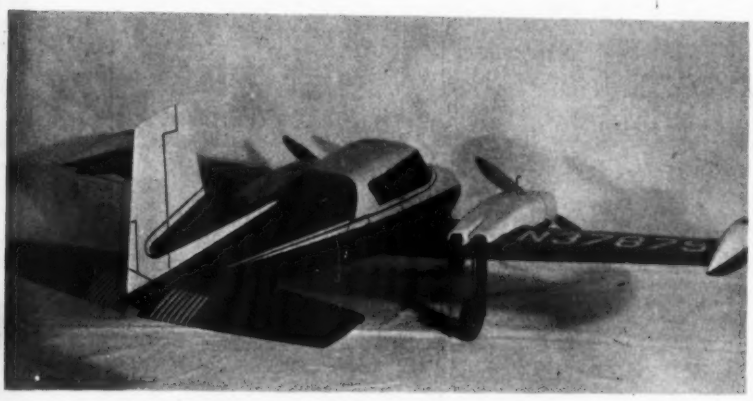
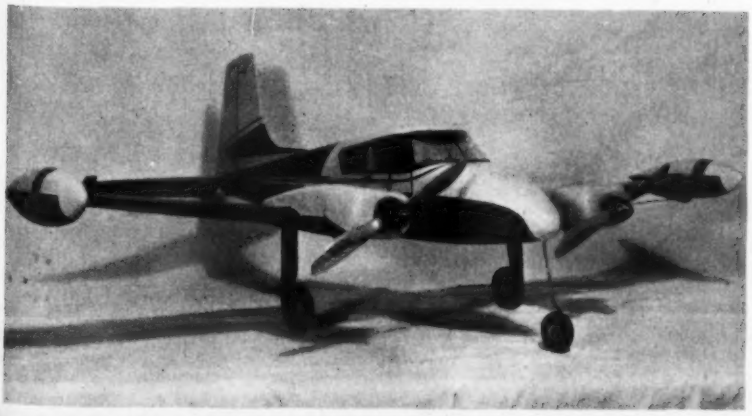
Heads of the twin Webras stick out from the "flat" cowls. For that eye-popping color scheme, sand and sand and do exactly what the man sez.



With the exception of lead-outs, needle valves, and other modeling tell-tale details, the only departure from scale is the half inch addition to the gear for prop clearance. Below—pretty, any view.



Cessna 310

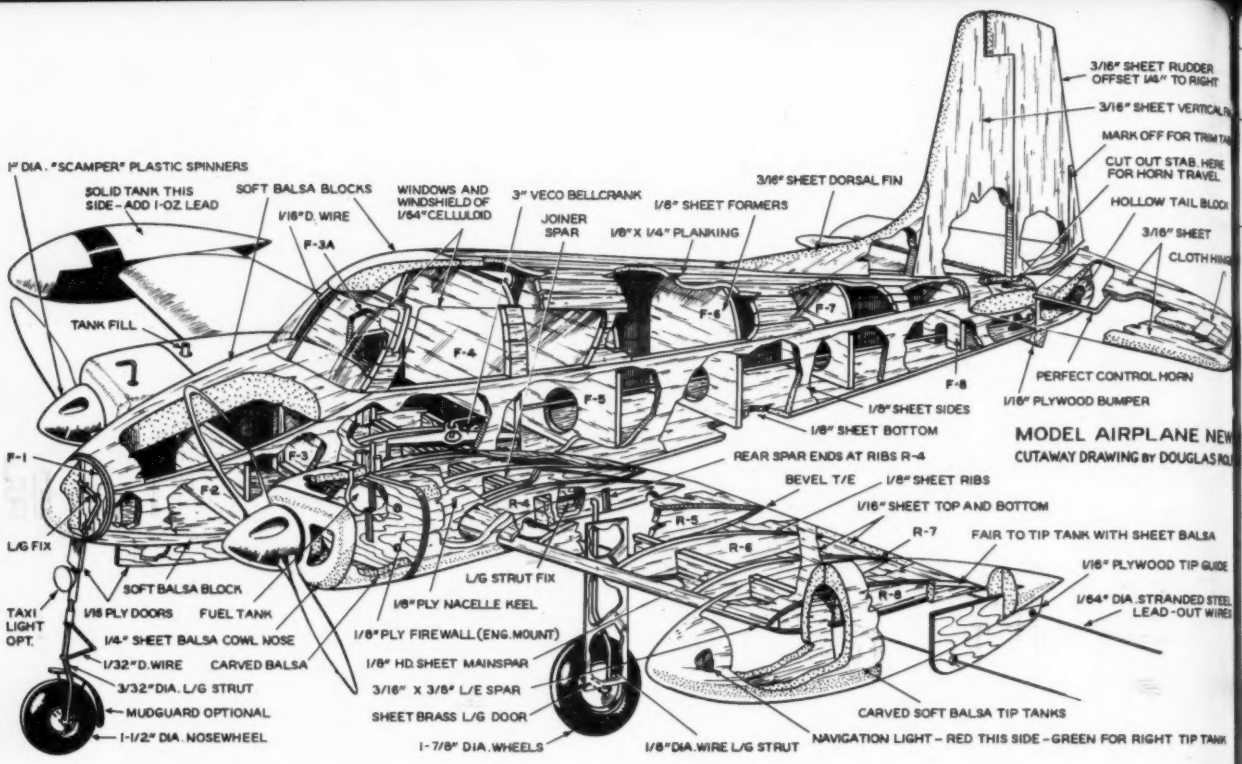
By HARRY A. WILLIAMSON

•

This twin-engined scale job is nice airplane, as pilots would say. No involved fancy stuff, but real looking. On .15 engines, good power reserve.

OUTSTANDING performance and appearance distinguish the Cessna 310 as a "hot" competitor in the currently booming light-twin, executive plane market. This latest addition to Cessna's line of business and private aircraft is just about the "schmaltziest" ship flying today.

Powered by two, 6-cylinder, Continental engines, rated at 240 h.p. each, the "310" cruises at 190 mph plus on only 60% power with a full gross load of 4,600 pounds. Top speed is in excess



of 220 mph! The excellent single-engine performance of this ship endears it to the hearts of the pilots and gives it that nice, comfortable margin of safety so desirable in executive transports.

The luxuriously appointed cabin, with its foam-rubber seats, provides ample room for a total of five people. The sharp, downward slope of the nose provides excellent visability when taxiing and in flight. Truly, this is an outstandingly modern airplane and it's all yours for only $49,950.00!

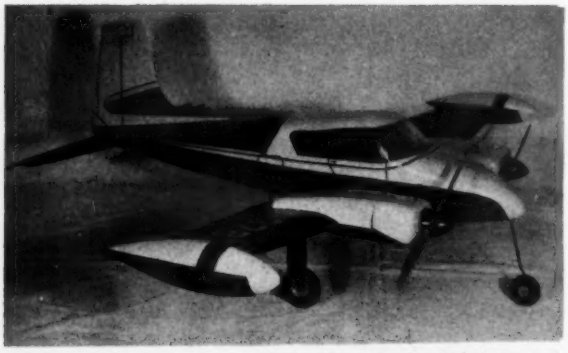
When we first saw a picture of the "310" some time back, it was love at first sight. Since we were smitten and couldn't afford to buy the real thing, the next best thing was to whip up a model version. The results are presented to you on these pages.

We wrote to the Cessna factory in Wichita, requesting a set of scale drawings and some performance poop, and their generosity helped us draw up a ship that is as true to scale as possible. The only deviation from true scale is the addition of ½" to the gear length, to provide adequate prop clearance.

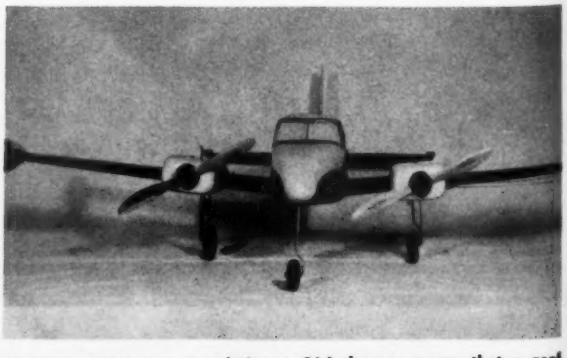
This model is built to a scale of 1" equals 1', giving it a 36" wing-span. At first glance this may seem a bit on the small side for the two .15 cu. in. engines but scale models have a strong tendency to come out on the heavy side, and the extra power is then needed to insure good performance.

Construction of the "310" is not at all difficult, but should be tackled only after the drawings and text are completely understood. The materials used are all commonly available in most hobby shops. The design of the model is "standard" throughout—nothing unusual or tricky. The nacelle design may seem a little out of the ordinary by virtue of the plywood keels, but this feature was incorporated to provide a strong, vibration-free engine mount, in addition to providing a point for secure gear attachment.

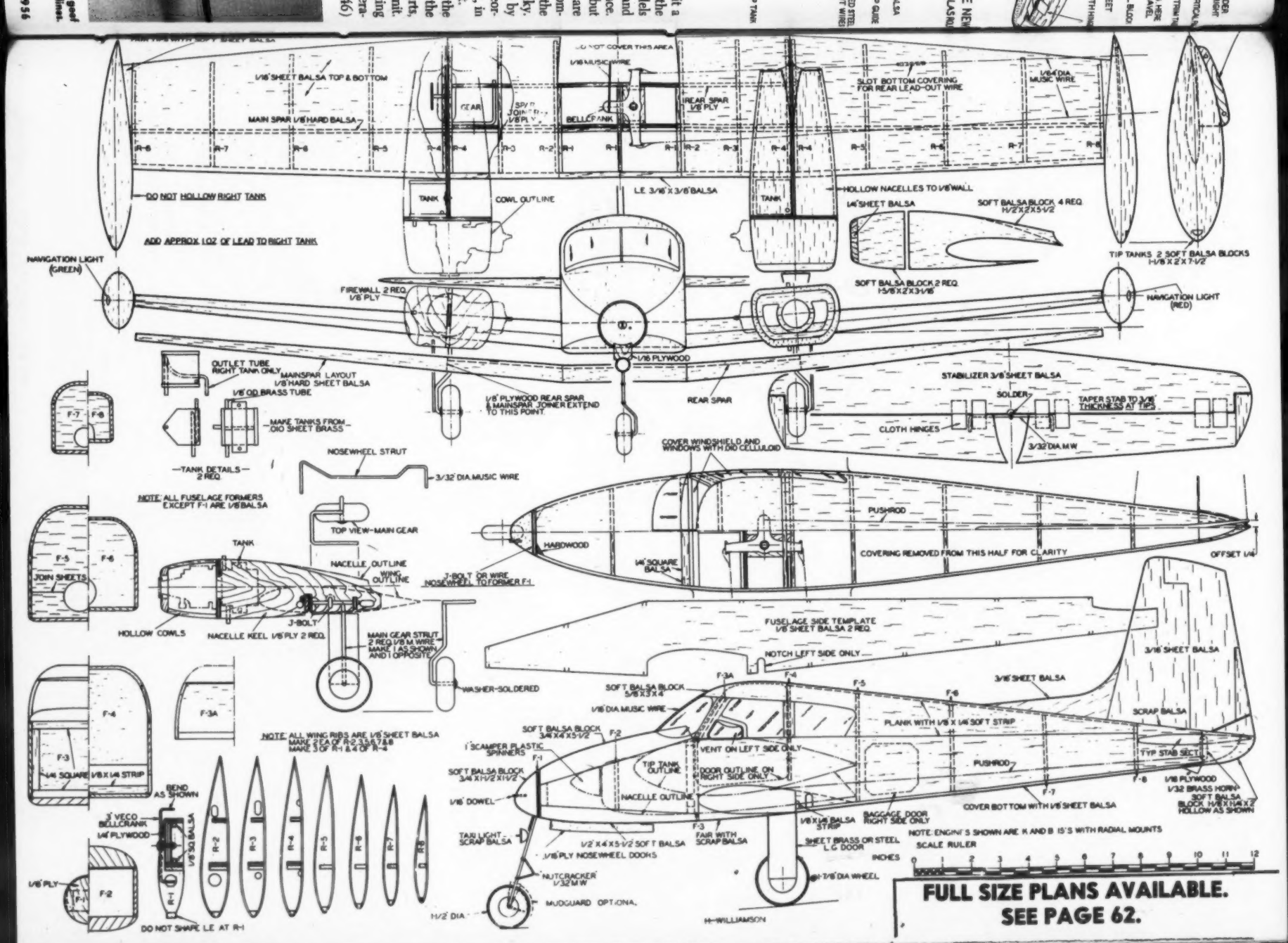
The actual building of the model should begin with the wing, since it must be completed before mating it with the fuselage. After cutting out the required number of parts, begin assembly, making up the main spar into a unit. Then, add the ribs to the main and rear spars, working from the center section out to each tip. During this operation, the spars should be (*Continued on page 46*)



These clean lines hide some mighty sharp structural design, as is apparent from Doug Rolfe's cutaway drawing at the top of the page.



Large prop disc area in relation to 36-inch span means that a goof on weight won't put you out of business. Ship stays out on lines.


DO NOT COVER THIS AREA
1/16 MUSIC WIRE
1/16 SHEET BALSA TOP & BOTTOM
MAIN SPAR 1/8 HARD BALSA
GEAR
SPLIT JOINER 1/8 PLY
BELLCRANK
REAR SPAR 1/8 PLY
SLOT BOTTOM COVERING FOR REAR LEAD-OUT WIRE
1/64 DIA MUSIC WIRE
DO NOT HOLLOW RIGHT TANK
TANK
COWL OUTLINE
L.E. 3/16 X 3/8 BALSA
HOLLOW NACELLES TO 1/8 WALL
1/4 SHEET BALSA
SOFT BALSA BLOCK 4 REQ. 1-1/2 X 2 X 3-1/2
ADD APPROX. 1 OZ. OF LEAD TO RIGHT TANK
SOFT BALSA BLOCK 2 REQ. 1-5/8 X 2 X 3-1/16
TIP TANKS 2 SOFT BALSA BLOCKS 1-1/8 X 2 X 7-1/2
NAVIGATION LIGHT (GREEN)
NAVIGATION LIGHT (RED)
FIREWALL 2 REQ. 1/8 PLY
1/16 PLYWOOD
OUTLET TUBE RIGHT TANK ONLY
MAINSPAR LAYOUT 1/8 HARD SHEET BALSA
1/8 OD BRASS TUBE
MAKE TANKS FROM .010 SHEET BRASS
1/8 PLYWOOD REAR SPAR & MAINSPAR JOINER EXTEND TO THIS POINT
REAR SPAR
STABILIZER 3/8 SHEET BALSA
SOLDER
TAPER STAB TO 3/16 THICKNESS AT TIPS
CLOTH HINGES
3/32 DIA M.W.
TANK DETAILS 2 REQ.
NOSEWHEEL STRUT
3/32 DIA MUSIC WIRE
COVER WINDSHIELD AND WINDOWS WITH .010 CELLULOID
NOTE: ALL FUSELAGE FORMERS EXCEPT F-1 ARE 1/8 BALSA
JOIN SHEETS
TOP VIEW-MAIN GEAR
TANK
NACELLE OUTLINE
WING OUTLINE
J-BOLT OR WIRE NOSEWHEEL TO FORMER F-1
PUSHROD
HARDWOOD
1/4 SQUARE BALSA
COVERING REMOVED FROM THIS HALF FOR CLARITY
OFFSET 1/4
HOLLOW COWLS
NACELLE KEEL 1/8 PLY 2 REQ.
J-BOLT
MAIN GEAR STRUT 2 REQ 1/8 M. WIRE MAKE 1 AS SHOWN AND 1 OPPOSITE
WASHER-SOLDERED
FUSELAGE SIDE TEMPLATE 1/8 SHEET BALSA 2 REQ.
NOTCH LEFT SIDE ONLY
3/16 SHEET BALSA
SOFT BALSA BLOCK 5/8 X 3 X 4
1/16 DIA MUSIC WIRE
PLANK WITH 1/8 X 1/4 SOFT STRIP
SCRAP BALSA
SOFT BALSA BLOCK 3/4 X 4 X 5-1/2
1" SCAMPER PLASTIC SPINNERS
VENT ON LEFT SIDE ONLY
TYP STAB SECT.
SOFT BALSA BLOCK 3/4 X 1-1/2 X 11-1/2
TIP TANK OUTLINE
DOOR OUTLINE ON RIGHT SIDE ONLY
1/16 PLYWOOD
1/32 BRASS HORN
SOFT BALSA BLOCK 1-1/8 X 1-1/4 X 2 HOLLOW AS SHOWN
1/16 DOWEL
NACELLE OUTLINE
COVER BOTTOM WITH 1/8 SHEET BALSA
1/8 X 1/8 BALSA STRIP
BAGGAGE DOOR RIGHT SIDE ONLY
TAIL LIGHT SCRAP BALSA
FAIR WITH SCRAP BALSA
1/2 X 4 X 5-1/2 SOFT BALSA
1/16 PLY NOSEWHEEL DOORS
SHEET BRASS OR STEEL L.G. DOOR
NOTE: ENGINES SHOWN ARE K AND B 15'S WITH RADIAL MOUNTS
SCALE RULER
INCHES
NUTCRACKER 1/32 M.W.
MUDGUARD OPTIONAL
1/2 DIA
1/8 DIA WHEEL
H-WILLIAMSON
NOTE: ALL WING RIBS ARE 1/8 SHEET BALSA
MAKE 2 EA OF R-2,3,5,6,7&8
MAKE 3 OF R-1 & 4 OF R-4
1/4 SQUARE
1/8 X 1/4 STRIP
BEND AS SHOWN
3 VECO BELLCRANK
1/4 PLYWOOD
1/8 SQ BALSA
1/8 PLY
DO NOT SHAPE L.E. AT R-1
FULL SIZE PLANS AVAILABLE.
SEE PAGE 62.

◉Cleveland..

By CHARLES TRACY

When one city outstrips all others in modeling, it pays to look for the explanation.

When they see this picture map in The Press, model fans and aficionados have no problem finding the site of an Annual Junior Air Races.

Model Air Capital

Flying activities at model airplane airfield, Cleveland Hopkins Airport, run from Operations Building, set up by Recreation Department.

► Among the nation's busiest model plane builders and fliers are those living in Greater Cleveland. They take part in more big league air meets, compete for more first class awards than their model-building brethren in almost any other metropolitan area.

For the last 10 years, the pace in Cleveland has been zooming as though jet propelled. There are major events every month for all types of models. A year's program covers indoor, outdoor, control-line, free-flight, scale, radio, PAA Load, Wakefield, FAI Gas, Nordic, Navy Carrier, Jetex, endurance, weight lifting, speed, and a few others that only the fliers in Cleveland recognize—such as prefab indoor duration.

Builders never quite recover from one big meet before they're tail-over-prop into the next one. Contests are always open to fliers from anywhere. Here's the year's traditional calendar, not mentioning a dozen smaller events staged by some of the 20 active clubs in the area:

January: Great Lakes Indoor Air Meet; six age divisions and four model types; attracts 400 entrants; world's biggest.

Flying lightened Top Flite Stinson, 9-year Ronnie Willis, Columbus, won a popular pre-fab contest.

Dwarfed by Weatherhead Trophy, 10-year Dan Tracy, Lakewood, 9th Annual Model Show.

Flying Circus winners inspect Sabres, at Columbus. Jack Garfinkel, sponsor, front-center.

$500 scholarship check to Bob Petruska, Cleveland, presented by Ann Vetter, Women's NAA.

Open-class contestants welcome. Tony Becker, AMA Dist. Vice Pres., all the way from Philly.

Smiling prize winners of Flying Circus, just had rides in Cleveland Air Taxi copter. Incentive!

February: American Airlines Gas Model Club Awards Banquet; not a contest but for 18 years the biggest model aviation social event on the calendar. Fills a downtown hotel ballroom every year.

March: National Model Plane Show; the only scale model meet of any size left in the U. S.; attracts 2000 entries.

April: Hobby Dealers "Fly-for All"; control-line preseason warm-up with a prize for every three-lap flight.

May: Armed Forces Day Air Show; control-line featuring the Navy Carrier landing event with pilot courses for prizes.

International Competition; for Wakefield, FAI Gas and Nordic gliders.

June: Lakewood Flite-Masters' free-flight event; a club-sponsored contest that has reached major proportions.

July: Junior Air Races; in its 19th year, the Nationals for the Great Lakes area; takes two Sundays to operate; one for control-line, the other for free-flight; is the "maximum" effort meet of the year in this area.

Garfinkel Flying Circus; bringing the simple outdoor flying model types to 350 playgrounds where thousands of youngsters are taught to build and fly them; finals are designed to fit in-the-city parks and playgrounds, under regular simplified endurance flying rules, with major awards such as plane trips and helicopter rides.

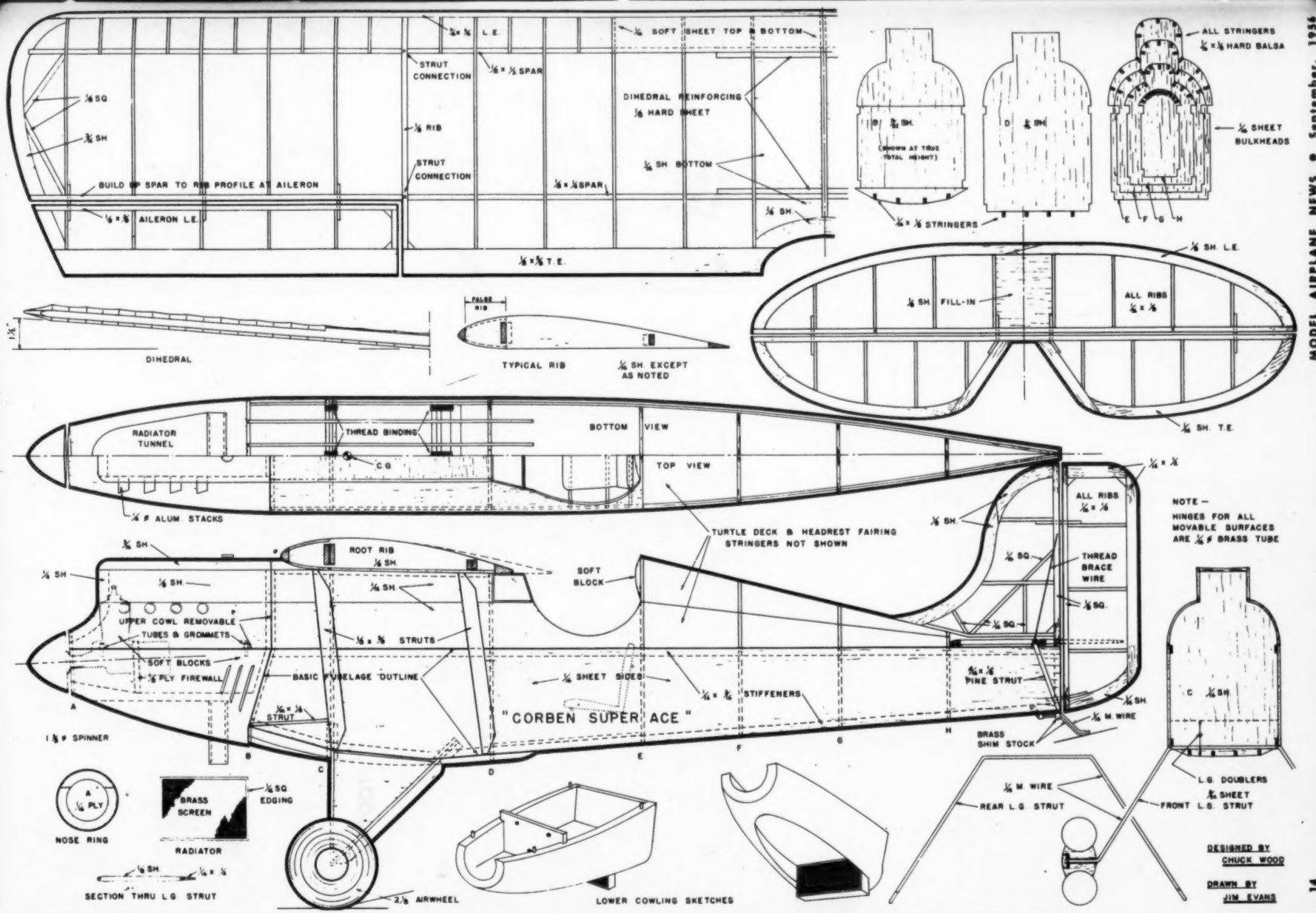
August: Lake Erie Gas Model Club free-flight meet; set-up for Half-A size motors, it's a popular event on the calendar.

September: Sport Plane Races; control-line contest to experiment with events such as team and "rat" racing; endurance and PAA-Load flying.

October: Press Do-It-Yourself Show and Family Fair; 10-day exhibit of all the winning planes in all the major meets along with the trophies they won; in the city's largest hall, Public Auditorium, along with a $300,000 show of hobby and home-fixing gadgets.

November and December: Flying sites are arranged for indoor air meet practice; (*Continued on page 56*)

All the model planes may not be in Cleveland but it sure looks like it! Some of the 1,200 models entered Great Lakes Indoor Meet, 1956.



DESIGNED BY CHUCK WOOD

DRAWN BY JIM EVANS

FULL SIZE PLANS AVAILABLE. SEE PAGE 62.

CORBEN Super Ace

By CHARLES R. WOOD

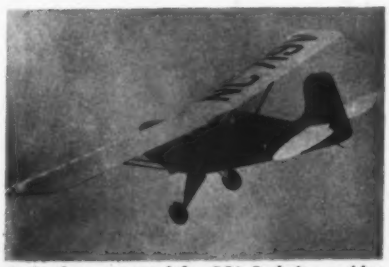
One of the greatest of all-time home-built planes, was this belle of the thirties. Flies like a dream on .049.

A Ford Model A engine cowled nicely into the business end of the fuselage. A generous wing area of 240 sq. in., and a weight of 10 oz. makes this realistic model a smooth performer.

Big ship and model proportions never have more ideally coincided! Plans were scaled down from 10 sheets of Mr. Corben's original drawings so don't let the judges sass you. The idea!

The Corben Super Ace was a "home-built" airplane of the middle 1930's and one of the few successful airplanes powered with a reworked Model-A Ford engine. Some of the Corbens were factory built, but most of them were constructed by amateur builders in backyards and garages to plans and specifications supplied by Mr. O. G. Corben. The structure was admirably suited to amateur skills, as many of the parts were fabricated from plywood and spruce, while the fuselage and tail components could be welded by a garage mechanic. Even today the basic design of the Super Ace may be found in the Corben Baby Ace—a modified and modernized version powered with a variety of lightplane engines.

The model is somewhat larger than the average Half A flying scale with a wing area of 240 square inches. This large wing area, combined with a weight of 10 ounces, has much to do with the realistic and smooth performance of the Corben. To see how realistically the model does fly, follow me if you will (*Continued on page* 45)

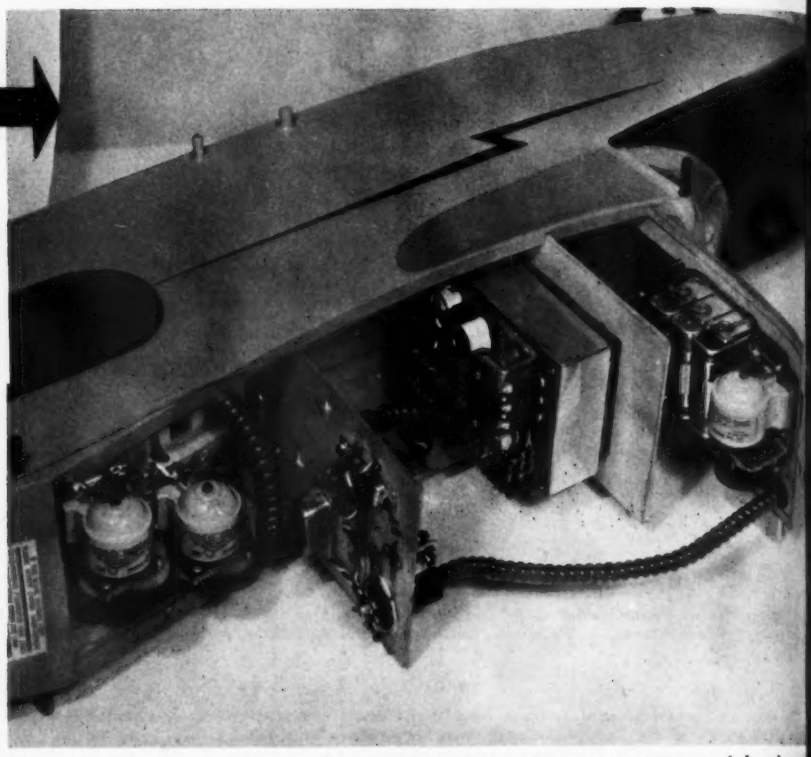


And what a natural for RC! Cockpit provides a handy access. Original used a Cub .049B.

This is Multi

By ERNEST KRATZET

For 99 out of 100 modelers this is real dream stuff. It costs nothing, however, to read up on latest techniques.



Bramco five-channel installation in author's DMECO Cruiser, illustrates compartmented breakdown: engine servo, batteries; then receiver; sockets, wiring, etc.; elevator, rudder servos.

PART I

► As a starting point of this discussion, let's first make sure we're all on common ground regarding the interpretation of "multi-channel." Technically speaking, two or more channels can be construed as multi-channel. However, for purposes of this discussion, the words "multi-channel" will refer to the increasingly popular concept of at least five channels. We therefore will not deal with the various methods of obtaining the desired functions by using just one, two, or three channels. The following applies only to the problems involved in using five or more channels. This is the method used by such successful fliers as Harold deBolt, Frank Schmidt, Frank Madl, Colby Evett, and three-time Nats winner Alex Schneider, plus many others.

The basic theory behind this type of multi flying is that for each job to be done there is a separate channel available. We therefore eliminate the problems involved when two or more operations must be carried out by one channel. By eliminating double-duty methods, we have actually simplified the task of controlling a model plane. This may sound peculiar to those who associate multi flying with visions of extremely complicated equipment. By assigning just one duty to each channel, we have also increased reliability. To make this clear merely liken a single-channel ship to a chain. When one link breaks, so does the chain. When the one channel goes, everything goes. But with five channels, the loss of one channel still leaves you with four *controllable* channels. Quite often a multi ship has been safely landed with one or more inoperative controls, yet only the pilot was aware of anything wrong.

Undoubtedly, the most common procedure in controlling a multi ship is to use one channel each for left rudder, right rudder, up elevator, down elevator, and motor control. This method lends itself nicely to the use of the realistic "joy stick" in the hands of the pilot. He then can actually have the "feel" of the ship and maneuver it automatically without actually remembering what has to be done next. By eliminating the "thinking" or pulse-counting, the pilot can follow all the movements of the ship much closer. He then flies the ship himself, making the necessary corrections as the need appears, just as though he were in the cockpit. This is imperative for the precise maneuvering needed in performing the complicated stunts possible with multi-channel. In essence, you make the plane do *exactly* what *you* want it to do instead of merely following through on some pattern of movement which the ship has determined to do itself. This diference is important and can only be appreciated once you've experienced it yourself.

Perhaps this would be a good place to discuss costs. There's no denying that a completely equipped multi ship initially costs considerably more than a single-channel one. However, we're all concerned with the total cost for a given amount of satisfaction over a given period of time. And here is where a good multi job begins to look like a bargain. Because of the nature of RC, we are constantly experimenting and trying to improve our flying. There are many modelers today flying single-channel who own 3, 4, or 5 ships. Each one with separate equipment and none giving them the satisfaction they might have with one good multi plane. The total cost when added up will, in many cases, surpass the cost of that one multi job. It seems that one can never keep up with the great number of systems and different pieces of equipment that keep constantly appearing on the market. No sooner does one get the "latest thing" in a ship ready to fly, then up comes something new and better. At times it can get frustrating because you just can't try them all. This condition is responsible for introducing many, many fliers to true multi-channel flying. In multi, they invest in

a good receiver, transmitter, and servos (either commercial or home-built), put it all in a well-built plane, and after that short "check-out" period, are ready to really enjoy themselves. They know they've got the ultimate in RC.

As a rule, one good multi plane will outlast many single-channel planes. You can fly it to your heart's content, not wondering if you shouldn't buy that new unit that Joe just got. With a multi job, you've gotten as far as anyone has to date. Because you've got more money tied up in your multi plane, you'll ordinarily build it with more care and you'll treat it with more respect. As a result, it'll last you much longer. And, unless you like to spend all your time in the work shop, you will be a happier modeler because you'll be on the flight line more often. (The most outstanding example of increased plane longevity is the multi-channel ship of Frand Madl's, of Chicago, which was just retired this year after 14 years of flying!) When all is said and done, a good multi plane doesn't cost any more than the several single-channel ships it replaces.

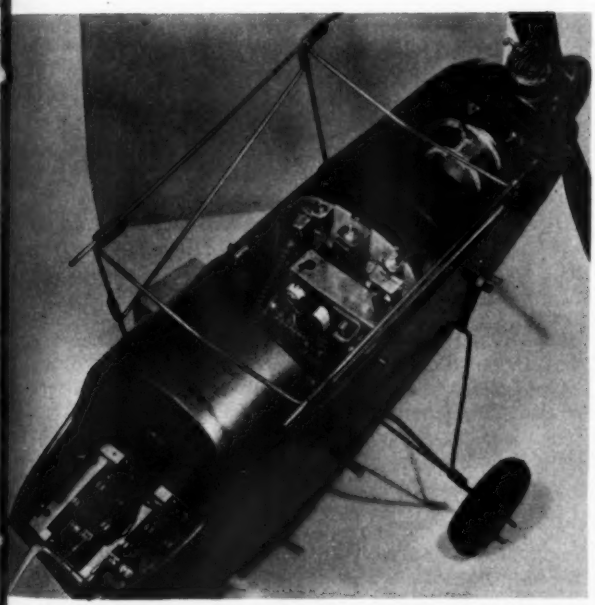
How about the complexities of changing to multi-control? Does one have to be a radio genius to operate one of those "flying telephone exchanges?" The answer is definitely—no. A case in point is the author who has been flying multi for several years and truly doesn't know the first thing about radio theory. All he wants to know is where to plug in the receiver. Just as a personal observation, it often seems that a surprising number of the present-day top-notchers don't know a condenser from a resistor. And what's more, they don't want to know. (No intention meant of slighting the very fine flying done by some of our well-known hams.) The point to be brought out is that you shouldn't shy away from multi-channel just because you're not up on your circuits. By following the manufacturer's instructions, there is no reason why you can't fly with the best of them, and in your first season too.

Actually, good multi-channel equipment requires less maintenance and adjustment than single-channel equipment. The reason is due to the greater safety factors used in the design of the multi equipment. They are not nearly as marginal and touchy as many single-channel units. Range is seldom a consideration with multi fliers. They always seem to have far more than they ever need. And stability, too, is increased. Once set, a multi job stays that way without constant tuning and "fiddling."

Let's look at some of the problems encountered when you switch to multi. First of all, you will expect to have a more complicated installation. The amount of wiring alone will double or triple. And more than ever before, you should heed that good advice "Keep your wiring *neat*." Seldom do you find a cleanly wired installation giving trouble. Wiring hints and details will be covered later on.

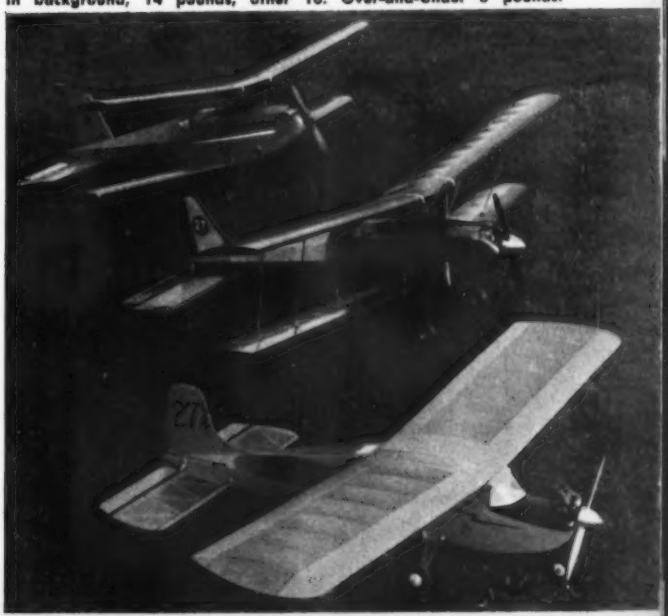
Don't make the mistake of thinking that just because you're going to have full controls that these will compensate for mistakes or sloppiness in construction of your model. It should, as always, be free from warps and as inherently stable as a free-flight. Another common misconception is that the wing-loading is of little concern in a multiship. Nothing could be farther from the truth. In reality, a multi ship should have a *lighter* wing-load than one with just rudder control. You can then get good wind penetration by trimming your elevators to compensate for varying conditions. This lower W/L will then result in easier and tighter maneuvers.

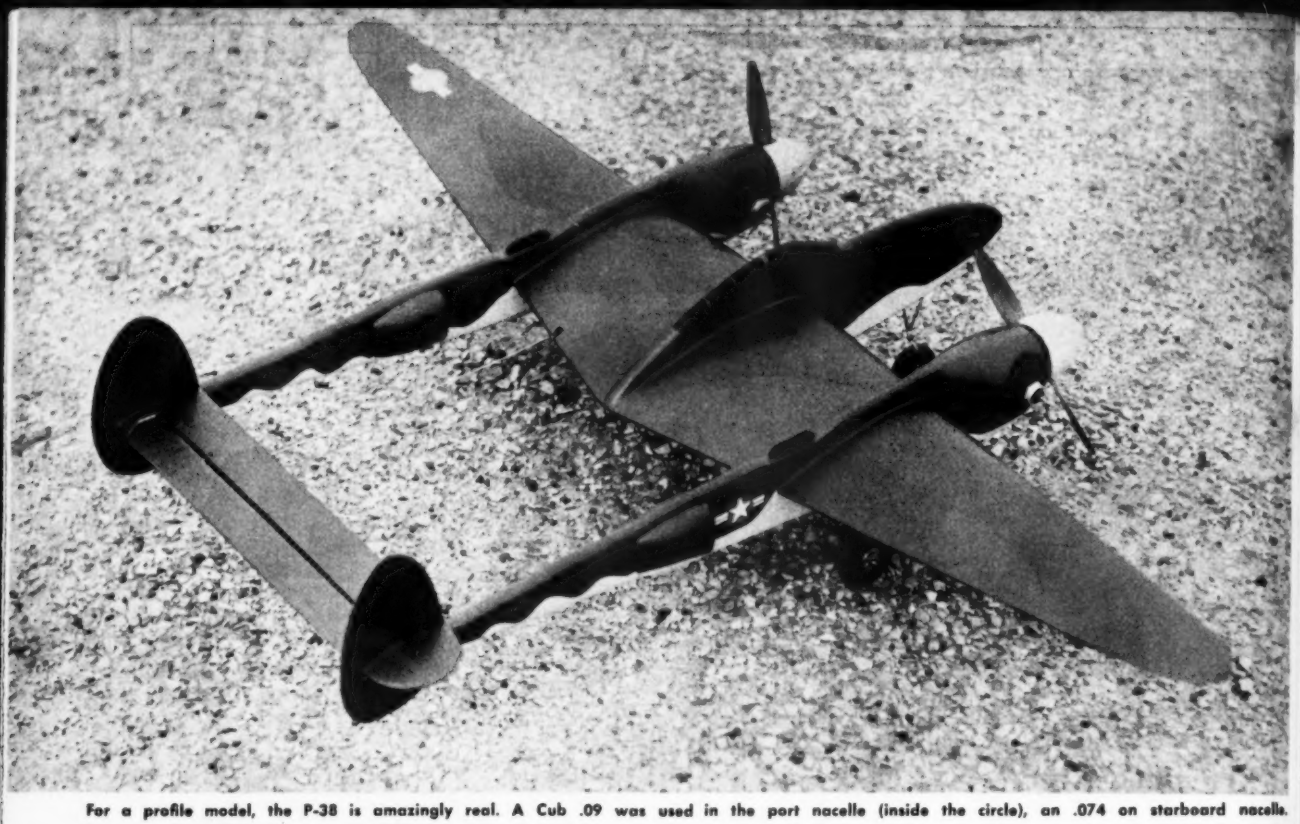
Naturally, to get this slower W/L you'll have to go to a plane slightly larger than the average rudder ship. About 750 sq. in. of wing area has proven to be about the best size for the average multi installation. Below this size, it will be a fight to keep the total weight down, at least on your first one. Prime consideration should be given to the *usable* space inside the ship. With more equipment you'll need more room. As a general rule, the kits designed especially for RC have more *usable* space than do the scale planes. The author strongly suggests that for your first venture into multi-channel operation, you choose a proven RC plane, preferably not a scale model. This applies even if you want to fly for sport alone. And even more so if you intend to enter into competition. Perhaps the design that fills these requirements best is the popular Live Wire Cruiser. Not that others aren't also satisfactory, but simply because you'll be flying with a design which has proven (*Continued on page* 54)



Blue Chip five-channel, plus all batteries, mounted on single tray in an ESKimo biplane. Servos in cockpit. Fox .59 (Moir Special) for power.

Well over $1,000 worth of aircraft used by Bramco for testing. ESKimo in background, 14 pounds, other 10. Over-and-Under 5 pounds.





For a profile model, the P-38 is amazingly real. A Cub .09 was used in the port nacelle (inside the circle), an .074 on starboard nacelle.

profile lightning . . .

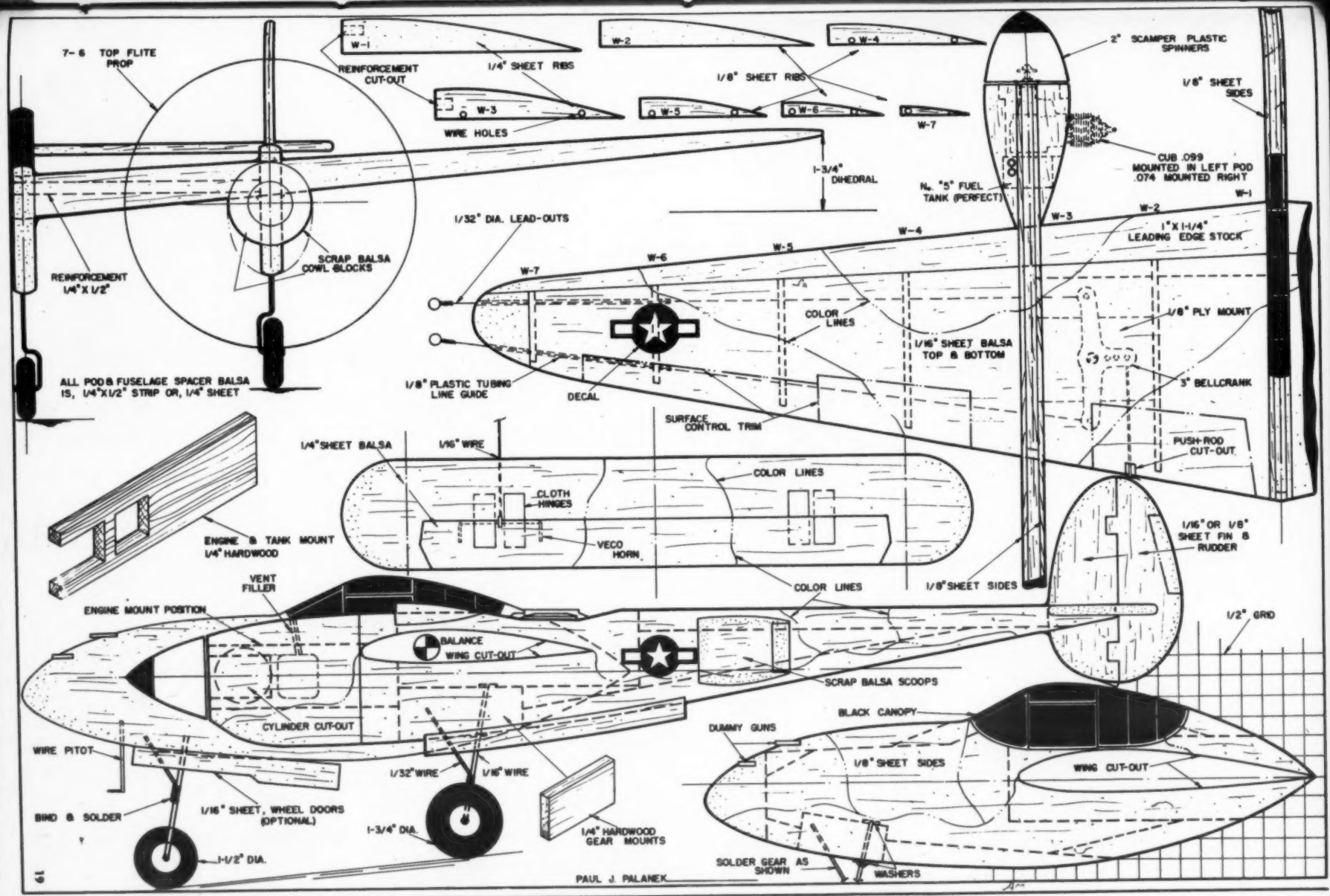
By PAUL J. PALANEK

The famous Lockheed P-38 Lightning makes unique twin-engined model that is easy on the pocketbook. Simple project. And strong.

► The Lockheed Lightning P-38 needs no introduction. Some 3000 were built for all service branches, and many Allied countries, in the Second World War. A variety of models were used in the European and African campaigns and large numbers were employed in the Pacific throughout the war.

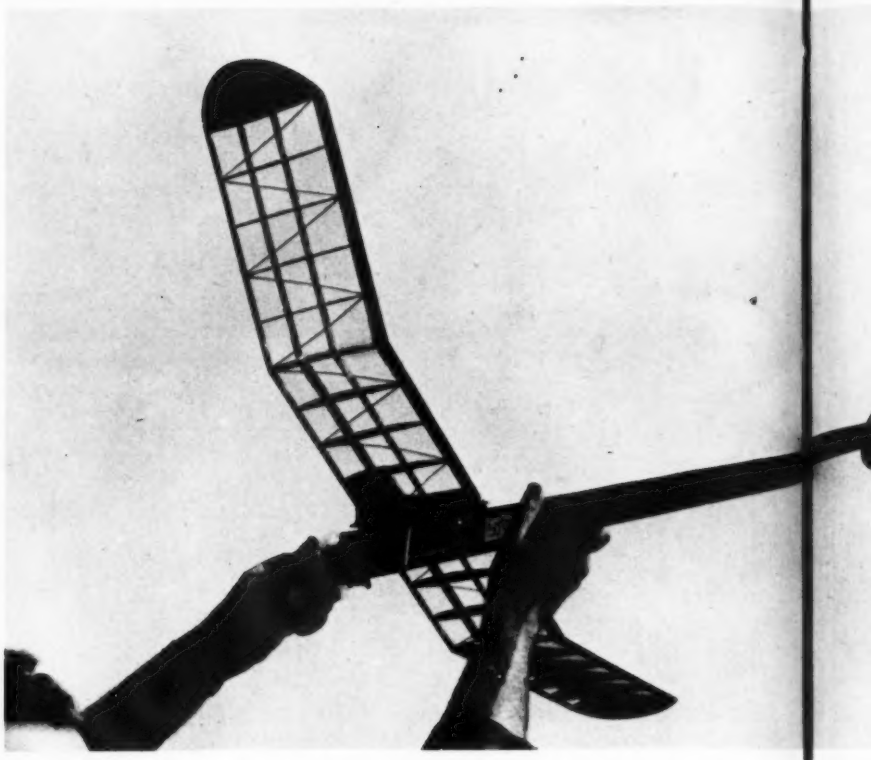
In our design of the Lightning, we strived for simplicity in construction, without losing out in appearance or design. Also in mind, is the modeler who has more than one engine, and of varying displacements. The design carries a Cub .09 in the port nacelle with a Cub .074 in the starboard nacelle. This unbalance of power greatly simplifies flying and balance. Bigger (*Continued on page* 58)

To insure line-tension as gas runs out, set port engine for longer run. For same reason, always start up the starboard engine first.



FULL SIZE PLANS AVAILABLE. SEE PAGE 62.

Saran film, with or without a paper covering foundation, makes tough and glossy finish. Contact cements make it easy to apply. A touch of steam draws it taut—and all wrinkles vanish by magic.



Pity the timer! By itself, Saran covering is a novelty. Over paper it has advantages.

Transparent Models

Finishing trailing edge, Saran over paper.

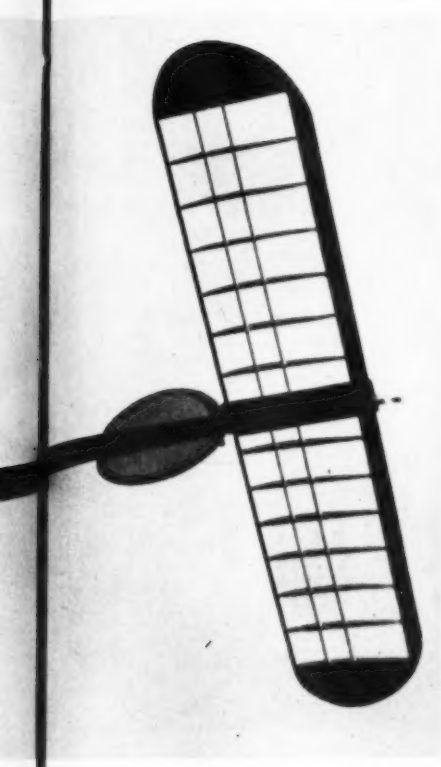
By H. SCHINDELMAN

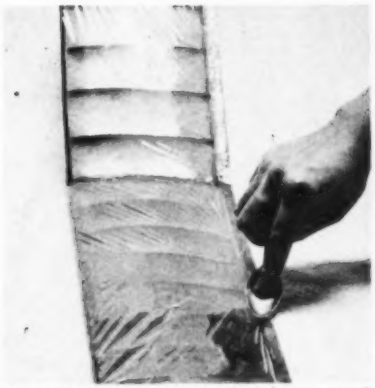
► Finding myself bored with the lack of new techniques in model plane design, I experimented with Saran film as a covering for my model planes, with astonishingly successful results. Saran can be used both as a covering for a new model, or as an overlay on your existing models. Saran makes it possible to obtain a glass-like finish almost impossible to achieve normally without excessive labor and weight. The increase in performance is remarkable. For example, a paper-covered glider given this treatment now averages almost ten seconds more per flight, putting it into the contest model category.

Saran is a vinyl plastic which has the following characteristics: 1—It is strong, having a tensile strength of over 7000 pounds per square inch, with a good puncture resistance. In the thickness normally available for household use (.005 inches thick), one ounce of material covers 2,000 square inches; 2—It is extremely non-porous and smooth; 3—It is unaffected by either glow or diesel engine fuels; 4—Its one drawback is a tendency to "run" once punctured. But this fault is minimized after the Saran has been applied, since the ribs tend to act as a barrier to prevent spreading.

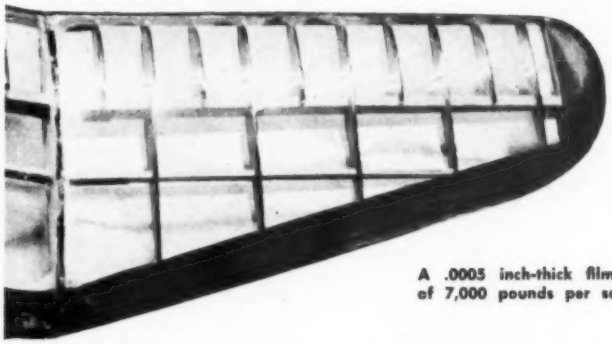
The method of application was a stumbling block at first, since most cement will not adhere to this almost inert smooth plastic. With the advent of contact cements, however, the problem was solved. These cements are applied and let dry completely before the surfaces are joined. When applying Saran to the framework, the wood is first doped so that the cement will not be absorbed. The cement is then applied and let dry (usually around

Here, the film has been affixed at center rib, is being pulled out over panel. Wrinkles don't matter. Underneath, is a paper covering.





Cemented edges are smoothed by a rounded object, such as spoon. The surfaces to be joined—at the trailing edge here—are both cemented, allowed to dry, then pressed together.



A .0005 inch-thick film has tensile strength of 7,000 pounds per sq. in. It is fuel-proof!

half an hour). The Saran is placed lightly over the frame and straightened, although wrinkles at this stage are not important. The Saran is now pressed firmly to the cemented surfaces with a rounded object such as a roller or an ordinary teaspoon. Where it is necessary to cement one Saran surface to another, both surfaces must be coated. However, Saran-to-Saran joints should be normally used only for patches since the lightest contact between the two surfaces will result in a bond which makes it difficult to adjust the covering. The covering is now tightened by the application of heat. The most convenient way I have found is to subject it to steam from a tea kettle. This tightening is made possible by the high degree of orientation of Saran film, which causes shrinking when exposed to high temperatures. When steaming, the Saran should be kept six inches from the kettle spout to prevent excessive tightening and overstressing which may weaken it.

The best contact cement I tested was #504 STIX, manufactured by the Adhesive Products Corp., of 1660 Boone Ave., New York 60. However, the cement used by shoe repair shops for attaching soles is practically as satisfactory and more readily available. Be sure to get the brownish cement and not the rubber cement which is also used. Your local shoe repair man will be glad to give you some and can refer you to his distributor for further supplies of both cement and thinner. Field patches can be applied quickly with polystyrene cement, but this is not permanent.

When Saran film is used as the only covering material, it has several disadvantages: It retains a high degree of flexibility, even after tightening, thus requiring a rigid framework to prevent deflection. It is also completely transparent. This makes a pretty sight but does not provide good visibility for a free flight model. For better visibility the framework must be dyed a bright color, which is not too practical, especially on larger models.

Both of these objections are overcome when Saran film is applied over a lightly doped colored tissue or Silkspan. The tissue will provide visibility (*Continued on page* 40)

Wrinkled as a prune at this stage, Saran will come out like sheet of glass. One ounce thin film covers 2,000 sq. in. of surface area.

Finished paper-and-Saran wing shines like crazy. Paper selected for coloring. Though tough, film alone runs somewhat after puncture.

BE

AILERONS.....HORIZONTAL STABILIZER..... 37.8 SQ.FT.
ELEVATORS.....19.1 SQ.FT.
RUDDER.....13.8 SQ.FT.
VERTICAL STABILIZER.....3.5 SQ.FT.

PROPELLER THRUST LINE VARIES FOR DIFFERENT ENGINE INSTALLATIONS.

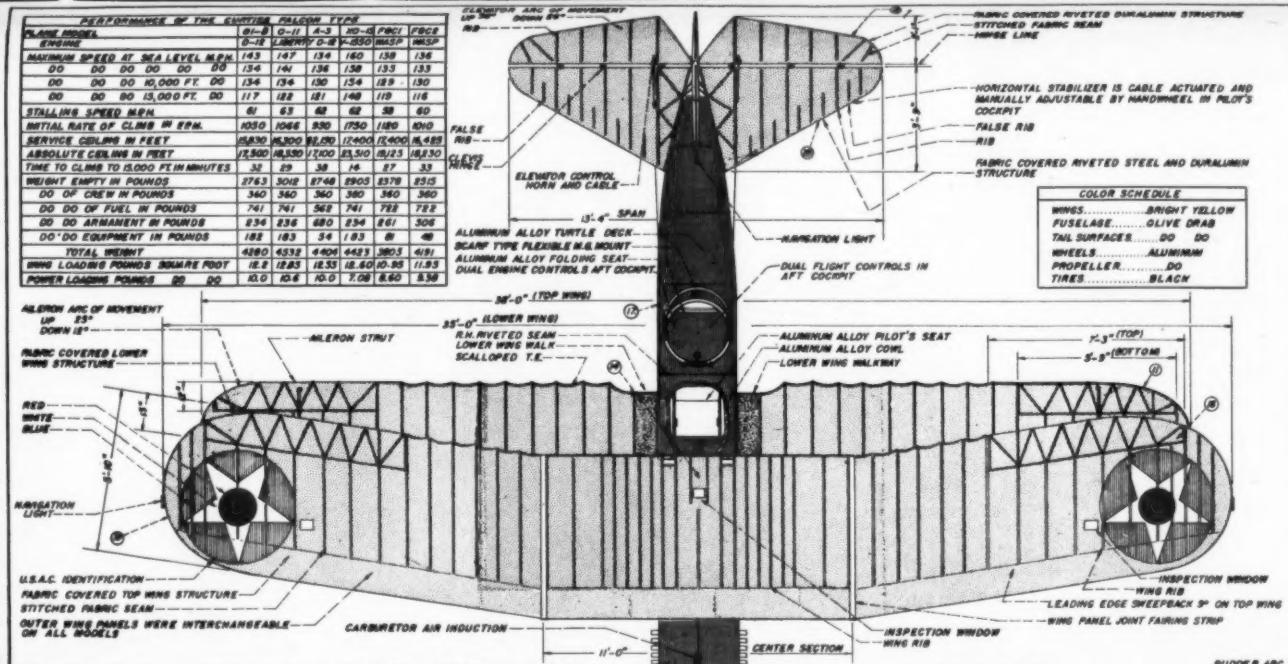
750 POUNDS OF MAIL OVER THE ANDES MOUNTAINS WITH EASE.

(DRAWN FOR MODEL AIRPLANE NEWS BY WILLIS L. HYE)

SHEET NO. 2

CURTISS FALCON—OLD ARMY AIR CORPS OBSERVATION.

PERFORMANCE OF THE CURTISS FALCON TYPE						
PLANE MODEL	01-B	0-11	A-3	XO-16	F6C1	F6C6
ENGINE	0-12	LIBERTY	0-12	V-1650	WASP	WASP
MAXIMUM SPEED AT SEA LEVEL M.P.H.	143	147	134	160	138	136
DO DO DO DO DO	134	141	136	158	135	133
DO DO DO 10,000 FT. DO	134	134	130	154	189	130
DO DO DO 15,000 FT. DO	117	122	121	148	119	116
STALLING SPEED M.P.H.	61	63	62	62	58	60
INITIAL RATE OF CLIMB IN F.P.M.	1050	1046	930	1750	1180	1010
SERVICE CEILING IN FEET	15,850	16,300	12,150	17,400	17,400	16,485
ABSOLUTE CEILING IN FEET	17,500	18,350	17,100	23,310	18,125	18,830
TIME TO CLIMB TO 15,000 FT IN MINUTES	32	29	38	14	27	33
WEIGHT EMPTY IN POUNDS	2763	3012	2748	2905	2378	2515
DO OF CREW IN POUNDS	340	340	340	380	340	340
DO DO OF FUEL IN POUNDS	741	741	568	741	722	722
DO DO ARMAMENT IN POUNDS	234	236	680	234	261	306
DO DO EQUIPMENT IN POUNDS	188	183	54	183	81	48
TOTAL WEIGHT	4280	4532	4404	4423	3803	4191
USING LOADING POUNDS SQUARE FOOT	12.2	12.85	12.55	12.60	10.85	11.95
POWER LOADING POUNDS DO DO	10.0	10.6	10.0	7.08	8.60	8.38



DESIGN NOTES ON CURTISS FALCON O-1
(1) ON VARIOUS MODELS, THE DESIGN OF THE TURTLEDECK VARIES SUCH AS BEING DEEPER OR SLOPING TO THE BASE OF THE VERTICAL STABILIZER.
(2) ON THE XO-1 AND O-1 MODELS, THE TAIL SKID WAS ATTACHED CLOSE TO EMPENNAGE.
(3) ON THE XO-1, THE HORIZONTAL STABILIZER WAS BRACED WITH TWO STREAMLINE WIRES ON THE TOP AND BOTTOM.
(4) O-16 WAS FIRST PRODUCTION MODEL HAVING OLEO-HYDRAULIC LANDING GEAR AND STEERABLE TAIL WHEEL. ORIGINAL DESIGN OF RUBBER COMPRESSION DISKS AS LANDING GEAR SHOCK ABSORBERS BECAME OBSOLETE. LANDING GEARS WERE INTERCHANGEABLE ON ALL MODELS.
(5) ON MODEL XO-1, ALL INTERPLANE STRUTS WERE FAIRED TO A FINE STREAMLINE SECTION.
(6) CURTISS V-1150 WAS A WATER COOLED ENGINE AND THE FORERUNNER OF THE CONQUEROR ENGINE. (LIQUID COOLED ETHYL GLYCOL)
(7) ON THE XO-1, THE ORIGINAL RUDDER AERODYNAMIC BALANCE FOLLOWED THE CONTOUR OF THE VERTICAL STABILIZER. THIS WAS FOUND TO BE TOO LARGE ON INITIAL TEST FLIGHTS. THE AERODYNAMIC BALANCE WAS REDUCED TO THE CONFIGURATION SHOWN WITH GOOD RESULTS.
(8) ON XO-1, THE LEADING EDGE WAS TRAPEZOIDAL INSTEAD OF ROUNDED.
(9) THE ORIGINAL TIRES ON THE XO-1 AND O-1 WERE FITTED TO SAUVAGE WHEELS WITH MECHANICALLY ACTUATED BRAKES, UNINDUALLY CONTROLED.
(10) ON XO-18, SOLID FORGED DURALUMIN PROPELLER WAS INSTALLED. ON PACKARD POWERED XO-1, ADJUSTABLE PITCH STEEL HUB, ALUMINUM ALLOY BLADE PROPELLER WAS USED.
(11) CONVENTIONAL AILERON WITHOUT AERODYNAMIC BALANCE BUT DIFFERENTIALLY OPERATED WAS INSTALLED ON ALL AIRPLANES PRIOR TO O-1E. LATER AIRPLANES (O1-E AND SUBSEQUENT) HAD FRISE AILERONS.
(12) O1-B AND O-39 HAD AERODYNAMIC BALANCE ON ELEVATORS.
(13) O1-B AND O-39 HAD RECESSED OBSERVER'S GUN MOUNT.
(14) O1-B HAD CENTER SECTION CUT-OUT.
(15) RADIATOR DESIGN VARIED WITH DIFFERENT MODELS. (SIZE AND TYPE)
(16) O1-B AND O-39 HAD ENLARGED TOP AILERON.
(17) ALL BASIC FUSELAGE STRUCTURES FOR VARIOUS MODELS WERE INTERCHANGEABLE EXCEPT ENGINE MOUNT AND AFT M.G. GUN RING.
(18) ALL TAIL SURFACES WERE INTERCHANGEABLE ON ALL MODELS.
(19) TOP AND BOTTOM WINGS WERE INTERCHANGEABLE ON ALL MODELS.
(20) O-11 FUSELAGE, SPECIAL FITTINGS TO MOUNT WATER BALLAST TANK NEXT TO TAIL SKID. BALLAST TANK WAS NECESSARY TO OFFSET NOSE-HEAVINESS CAUSED BY WEIGHT OF LIBERTY ENGINE INSTALLATION.
(21) MODELS USING D-12 ENGINES HAD INTEGRAL WELDED STEEL TUBE ENGINE MOUNTS ATTACHED TO FUSELAGE WITH 4 TAPER PINS AND 2 CABLES. O1-B, O1-C, AND A-3 WERE INTERCHANGEABLE. XA-4, XO-13, F6C-1, OC-1, F6C-2, AND OC-2 HAD LAMINATED SHEET DURALUMIN PLYWOOD ENGINE RING ON STEEL TUBE DETACHABLE MOUNT.

CURTISS FALCON			
MODEL	LENGTH	POWER	MAJOR CHANGES
XO-1	26'-7"	400	IN 1924 OBSERVATION CONTEST.
XO-1	26'-6"	360	XO-1 WITH PACKARD 1A-1500
O-1	27'-5"	435	CURTISS D-12
O-1A	27'-6"	420	REV. O-1 DEEPER FUSELAGE
O-1B	27'-3"	435	IMPROVED BRAKES
O-1C	27'-3"	435	REWORKED O-1B
O1-E	28'-6"	435	OLEO STRUTS, FRISE AILERONS
O1-F	28'-6"	435	REVISED O1-E
YO-1B	27'-2"	435	MODIFIED O1-E
O1-E	27'-6"	435	NEW LANDING GEAR
XO-11	27'-6"	480	REV. O1 WITH LIBERTY 18A
O-11	28'-6"	420	SAME AS XO-11 (IMPROVED)
XO-11A	28'-6"	435	NEW TAIL AND TAIL SKID
XO-12	27'-5"	410	P & W R-1340-11 (AIR COOLED)
XO-13	28'-6"	600	SAME AS O-1, WITH ENG. CHANGE
XO-13A	28'-6"	600	WING RADIATORS
O-13B	28'-6"	600	O1-C WITH CURTISS CONQUERER
YO-13C	27'-6"	600	MODIFIED O1-E (PRESTONE)
YO-13D	28'-6"	600	SUPERCHARGED O-11
XO-16	27'-6"	600	O-11 PRESTONE COOLING
XO-18	27'-6"	600	O-11 CHEETAH ENGINE
Y10-26	27'-6"	600	O1-E WITH ENGINE CHANGE
O-39	27'-0"	600	AS O1-C WITH CANOPY
XBT-6	27'-2"	435	CONVERTED O1-E (TRAINER)
OC-1	28'-4"	410	NAVAL OBSERVATION
OC-2	28'-4"	410	DO DO
F6C-1	28'-4"	410	SAME AS U.S. ARMY A3-A
F6C-2	28'-4"	410	DO DO DO A3-B
A3	28'-4"	435	SAME AS O-1. 6 GUNS
A3-A	27'-4"	435	REVISED A-3
A3-B	27'-2"	435	IMPROVED A-3. FRISE AILERONS
XA-4	28'-4"	410	AIRCOOLED ATTACK PLANE

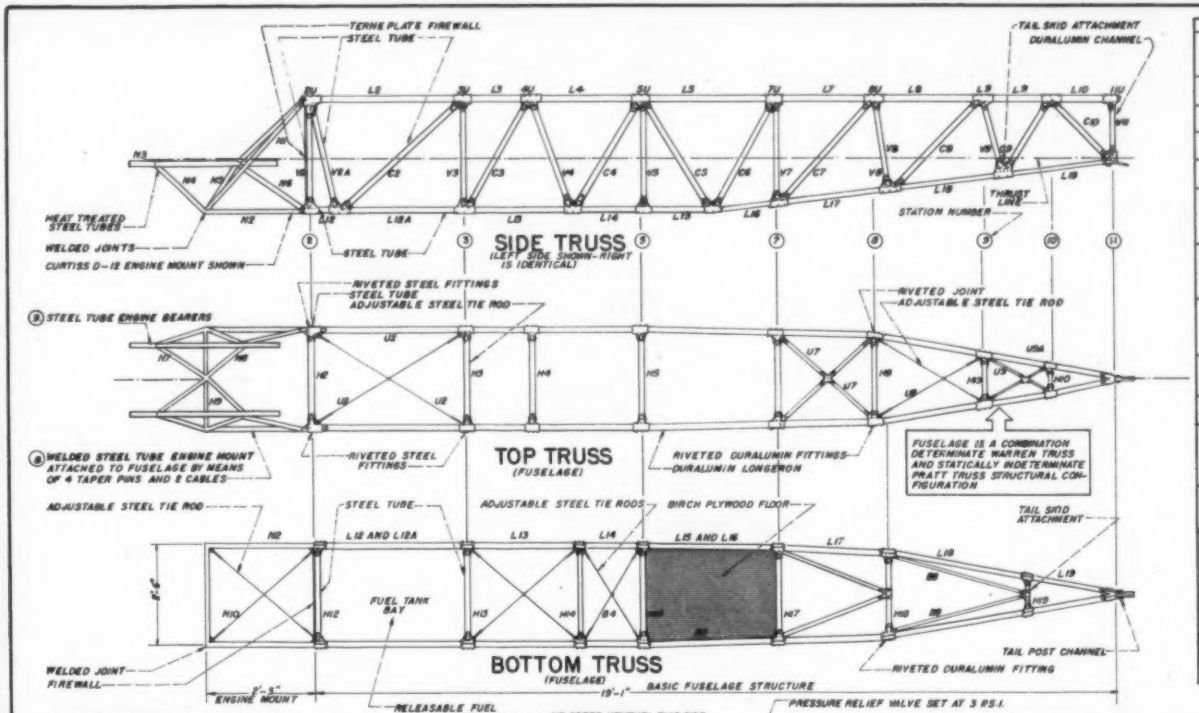
GENEOLOGY THE CURTISS FALCON BIPLANE				
MODEL	ENGINE TYPE	SERVICE	YEAR	PLANES BUILT
XO-1	PACKARD	U.S.A.C.	1924	1
XO-1	LIBERTY V-1650	DO	DO	1
O-1	CURTISS V-1400	DO	1926	10
O1-A	LIBERTY V-1650	DO	DO	2
O1-B	CURTISS V-1150	DO	1927	23
O1-C	DO	DO	DO	4
O1-E	DO	DO	1929	37
O1-F	DO	DO	DO	1
YI-01E	DO	DO	1931	1
O1-B	DO	DO	1931	30
XO-11	LIBERTY V-1650	DO	1927	1
O-11	DO	NAT'L GUARD	1927-28	
O-11A	DO	DO	DO	1
XO-12	P & W R-1340	U.S.A.C.	1928	1
XO-13	CURTISS V-1570	DO	1927	1
XO-13A	DO	DO	DO	1
O-13B	DO	DO	1928	1
YO-13C	DO	DO	1930	3
YO-13D	DO	DO	DO	1
XO-16	DO	DO	1929	1
XO-18	CURTISS CHEETAH	DO	1928	1
YI-0-26	CURTISS V-1570	DO	1926	1
O-39	DO	DO	1932	10
XBT-6	CURTISS V-1150	DO	1932	1
OC-1	P & W R-1340	U.S.M.C.		SEE SHEET 4
OC-2	DO	U.S.M.C.		DO
F6C-1	DO	DO		DO
F6C-2	DO	DO		DO
A3	CURTISS V-1150	U.S.A.C.	1927	78
A3-A	DO	DO	1928	3
A3-B	DO	DO	1930	78
XA-4	P & W R-1340	DO	1929	1

CURTISS FALCON U.S. ARMY AIR CORPS O-1

SHEET NO. 1

(DRAWN FOR MODEL AIRPLANE NEWS BY WILLIS L. HYE)

BEGINNING A DETAILED STUDY OF THE FALCON FAMILY.


TERNE PLATE FIREWALL
STEEL TUBE
TAIL SKID ATTACHMENT
DURALUMIN CHANNEL
HEAT TREATED STEEL TUBES
WELDED JOINTS
CURTISS D-12 ENGINE MOUNT SHOWN
STEEL TUBE
STATION NUMBER
THRUST LINE
SIDE TRUSS
(LEFT SIDE SHOWN-RIGHT IS IDENTICAL)
RIVETED STEEL FITTINGS
STEEL TUBE
ADJUSTABLE STEEL TIE ROD
RIVETED JOINT
ADJUSTABLE STEEL TIE ROD
STEEL TUBE ENGINE BEARERS
WELDED STEEL TUBE ENGINE MOUNT ATTACHED TO FUSELAGE BY MEANS OF 4 TAPER PINS AND 2 CABLES
RIVETED STEEL FITTINGS
TOP TRUSS
(FUSELAGE)
RIVETED DURALUMIN FITTINGS
DURALUMIN LONGERON
FUSELAGE IS A COMBINATION DETERMINATE WARREN TRUSS AND STATICALLY INDETERMINATE PRATT TRUSS STRUCTURAL CONFIGURATION
ADJUSTABLE STEEL TIE ROD
STEEL TUBE
ADJUSTABLE STEEL TIE RODS
BIRCH PLYWOOD FLOOR
TAIL SKID ATTACHMENT
FUEL TANK BAY
WELDED JOINT
FIREWALL
ENGINE MOUNT
BOTTOM TRUSS
(FUSELAGE)
TAIL POST CHANNEL
RIVETED DURALUMIN FITTING
BASIC FUSELAGE STRUCTURE
WING AREA INCLUDING AILERONS 331 SQ.FT.
U.S.A.C. IDENTIFICATION
UPPER WING AIRFOIL CLARK "Y"
0° DIHEDRAL ANGLE
-1° ANGLE OF INCIDENCE
FABRIC COVERED UPPER WING
RELEASABLE FUEL TANK WAS INSTALLED ON EARLY MODEL FALCONS
AIR SPEED VENTURI THIS SIDE
OUTER WING PANEL JOINT COVERING
LEADING EDGE OF VERTICAL STABILIZER (TO LEFT) OFFSET 8" TO COUNTERACT PROPELLER TORQUE
STREAMLINE CABANE BRACE WIRE
STREAMLINE STEEL CABANE STRUT
PRESSURE RELIEF VALVE SET AT 3 P.S.I.
DOUBLE STREAMLINE LANDING WIRES RUNNING FROM AFT WING SPAR TOP WING TO FORWARD WING SPAR LOWER WING
DOUBLE STREAMLINE FLYING WIRES RUNNING FROM FORWARD WING SPAR LOWER WING TO AFT WING SPAR UPPER WING
STREAMLINE WIRE TIE
(TAKE OFF ATTITUDE)
FABRIC COVERED LOWER WING
AILERON ACTUATING STRUT
U.S.A.C. IDENTIFICATION
AILERON ADJUSTABLE LINKAGE
STREAMLINE STEEL INTERPLANE STRUT
0° DIHEDRAL ANGLE
-1° ANGLE OF INCIDENCE
LOWER WING AIRFOIL CLARK "Y"
LOWER WING CHORD 4'-6"
30 CAL. M.G.
WALKWAY
ADJUSTABLE CLEVIS FITTING
WING TIP FLARES (OPTIONAL)
DOUBLE EXTERNAL STREAMLINE DRAG WIRES RUNNING FROM FUSELAGE TO FORWARD WING UPPER WING AT STRUT POINT IN PLANE OF THE FLYING WIRES
PROPELLER DIAMETER 9'-0" (4)
MANUALLY CONTROLLED SHUTTERS ON TUNNEL RADIATOR FOR WATER COOLED ENGINES (5)
PAIRED WIRE WHEEL
BRAKE HOUSING FAIRING
5'-8" TREAD

THANKS IS EXTENDED TO CHRISTY MCGRATH AND VIRGINIA L. GRANDIN OF THE U.S.A.F. MUSEUM, WRIGHT-PATTERSON AIR FORCE BASE FOR LOAN OF TECHNICAL DATA USED IN PREPARATION OF THIS PROJECT. ALSO TO WILLIAM T. LARKINS, AMERICAN AVIATION HISTORICAL SOCIETY.

CONTROL SURFACE AREAS

AILERONS	34.20 FT.
HORIZONTAL STABILIZER	37.8 SQ.FT.
ELEVATORS	19.1 SQ.FT.
RUDDER	13.5 SQ.FT.
VERTICAL STABILIZER	3.3 SQ.FT.

CURTISS O-1B AIRPLANE SHOWN IN FRONT VIEW. CURTISS A3-B IS SIMILAR EXCEPT FOR STRAFING ARMAMENT. THE PROPELLER THRUST LINE VARIES FOR DIFFERENT ENGINE INSTALLATIONS.

ONE OF THE FEW COMMERCIAL FALCON MAIL PLANES PRODUCED WAS THAT FOR PAN-AMERICAN GRACE AIRWAYS POWERED BY A SUPER-CHARGED AIRCOOLED CYCLONE ENGINE. THIS AIRPLANE CARRIED 750 POUNDS OF MAIL OVER THE ANDES MOUNTAINS WITH EASE.

SHEET NO. 8

DESIGN NOTES ON CURTISS O-1

(1) ON AIRPLANES HAVING GEARED LIQUID COOLED ENGINES, VERTICAL STABILIZER WAS OFFSET 2° TO RIGHT.

(2) PROPELLER DIAMETER VARIED WITH DIFFERENT ENGINE INSTALLATIONS.

(3) LANDING GEAR VARIED WITH CHANGE IN TYPE OF SHOCK ABSORBERS (TREAD DIM.)

(4) PROPELLER BLADE PITCH SETTING VARIED WITH TYPE OF ENGINE AND HORSEPOWER.

(5) NO RADIATOR SHUTTERS WERE INSTALLED ON PRESTONE COOLED ENGINES.

(6) ON PROTOTYPE AIRPLANE, FAIREDWIRE SPOKE WHEELS WERE SUPPLIED. ON LATER MODEL AIRPLANE, ALUMINUM DISC WHEELS WERE SUPPLIED.

(7) PROVISION WAS MADE TO RIG A 1° DIHEDRAL ANGLE INTO TOP AND BOTTOM WING IF NECESSARY. MOST PLANES WERE RIGGED WITH NO DIHEDRAL.

(8) ALL AIRPLANES HAVING CURTISS D-12 ENGINES HAD INTERCHANGEABLE MOUNTS. THE SAME WAS TRUE OF THOSE AIRPLANES HAVING CURTISS CONQUEROR ENGINES INSTALLED.

(9) ON CURTISS O-11, WITH LIBERTY 12A ENGINE, ASH ENGINE BEARERS WERE USED TO ABSORB ENGINE VIBRATIONS.

(10) SOME AIRPLANES WERE EQUIPPED WITH HYDRAULIC BRAKES (CURTISS MFR.)

(11) CURTISS D-12 ENGINES HAD AN OIL COOLER INCLUDED AS PART OF RADIATOR. PRESTONE COOLED ENGINES WERE NOT EQUIPPED WITH OIL COOLERS.

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(13) EARLY PRODUCTION AIRPLANES HAD A HAND OPERATED INERTIA STARTER WITH BOOSTER MAGNETO. LATER AIRPLANES HAD BENDIX ELECTRIC STARTER.

(14) THE O-1 COULD QUALIFY FOR AN A.T.C. ISSUED BY BUREAU OF AIR COMMERCE. LOAD FACTOR AT HIGH INCIDENCE IS 6.9.

(15) RADIATOR SHUTTERS WERE INTERCHANGABLE ON ALL CURTISS O-1B ENGINES. O-11 HAD NO SHUTTERS ON LIBERTY ENGINE INSTALLATION.

LENGTHS OF FUSELAGE MEMBERS

NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
N1	39.5	L18	32.5	N9	23.8
N2	28.8	L19	30.7	N9	18.0
N3	84.5	V2	38.0	N10	10.3
N4	20.3	V2A	35.0	N12	30.0
N5	41.2	V3	38.0	N13	30.0
N6	24.3	V4	34.0	N14	30.0
N7	21.9	V5	32.0	N15	30.0
N8	18.2	V7	30.5	N17	28.0
N9	13.5	V8	26.5	N18	18.3
N10	44.0	V9	23.0	N19	7.6
L2	44.0	V8A	23.5	U2	52.8
L3	18.8	V11	18.0	U7	38.6
L4	32.0	C2	48.1	U8	36.5
L5	38.0	C3	37.0	U9	6.6
L7	28.0	C4	37.8	B3	43.0
L8	29.6	C5	37.0	B4	36.0
L9	19.6	C6	36.0	B5	FLOOR
L10	18.3	C7	41.3	B7	35.5
L12	8.0	C8	35.5	B8	33.7
L12A	34.0	C9	25.0	T2	44.6
L13	30.8	C10	24.6	T3	35.5
L14	30.2	H3	30.0	T5	35.5
L15	30.0	H3	30.0	T7	38.6
L16	18.0	H4	30.0	T8	29.2
L17	33.2	H5	30.0	T9	28.0

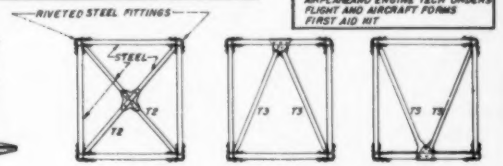
(ALL DIMENSIONS IN INCHES TO CENTERS)

CURTISS O-1 INSTRUMENTS

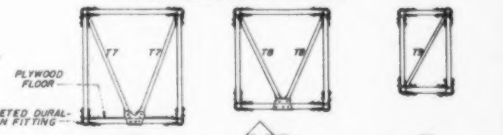
OIL TEMPERATURE INDICATOR
ENGINE COOLANT TEMP. INDICATOR
FUEL QUANTITY INDICATOR (GLASS TUBE)
AIR SPEED INDICATOR AND VENTURI
ALTIMETER (ANEROID TYPE)
COMPASS (MAGNETIC TYPE)
CLOCK (8-DAY SPRING WOUND)
OIL PRESSURE GAUGE (BOURDON TYPE)
ENGINE TACHOMETER
FLIGHT INDICATOR (TURN AND BANK)
VOLTMETER (0-30 VOLTS)
AMMETER (10-50 AMPS)

COCKPIT EQUIPMENT

2 SAFETY BELTS
2 CUSHIONS FLOTATION TYPE
2 COCKPIT COVERS
MAP CASE
AIRPLANE AND ENGINE TECH ORDERS
FLIGHT AND AIRCRAFT FORMS
FIRST AID KIT



FUSELAGE FRAMES



FUSELAGE FRAMES 3, 5, 7, 8, 9, ETC. ARE OF DURALUMIN TUBE OF VARIOUS DIAMETERS AND WALL THICKNESS. FRAME NO. 2 IS OF STEEL TUBE TO SUPPORT ENGINE MOUNT.

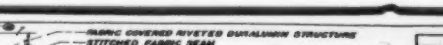
Curtiss

TRADEMARK OF THE CURTISS AEROPLANE AND MOTOR CORPORATION, ONE OF THE GREATEST NAMES IN AVIATION.

(DRAWN FOR MODEL AIRPLANE NEWS BY WILLIS L. HYE)

PERFORMANCE OF THE CURTISS FALCON TYPE

PLANE MODEL	O-1B	O-1E	A-3	A3-B FBC1	RACE
ENGINE	D-12	D-12	D-12	D-12	D-12
HORSEPOWER	435	435	435	435	435
WING AREA	331	331	331	331	331
WEIGHT EMPTY	2,350	2,350	2,350	2,350	2,350
USEFUL LOAD	1,650	1,650	1,650	1,650	1,650
GROSS WEIGHT	4,000	4,000	4,000	4,000	4,000
WING LOADING	12.08	12.08	12.08	12.08	12.08
POWER LOADING	9.19	9.19	9.19	9.19	9.19
MAX. SPEED	135	135	135	135	135
CRUISING SPEED	120	120	120	120	120
LANDING SPEED	55	55	55	55	55
CLIMB	1,000	1,000	1,000	1,000	1,000
CEILING	20,000	20,000	20,000	20,000	20,000
RANGE	400	400	400	400	400



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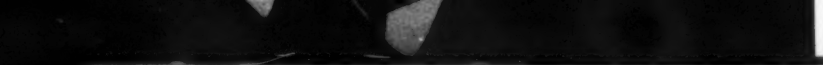


ENTIRE MODEL IS PAINTED WHITE
EXCEPT WHERE OTHERWISE NOTED

MARK SURFACE OUTLINES BLACK OR DARK GREY.

PAINT WINDSHIELD SILVER

COLOR BLACK

BLACK ANTI-GLARE PANEL

A B C

DOWEL

A B C

FRONT VIEW

FENCE - THIN METAL OR CARD

WING
3/16 HARD BALSA

STABILIZER
1/16 PLYWOOD OR HARD BALSA

FIN
3/16 BALSA

CUT OUT FOR WING

FUSELAGE BLOCK - SIDE VIEW. CUT FROM 1"SQ HARD BALSA

A-A B-B C-C

FUSELAGE SECTIONS

P · C · F · CHINN ·

Author's X-2 pokes its needle nose skyward. Feels good to know you carved plane yourself.

SOLID BELL X-2

By P. G. F. CHINN

To probe the so-called "heat barrier," Bell designed the X-2 rocket ship that can fly faster than 2,000 mph. These plans and step-by-step pictures help carve a replica.

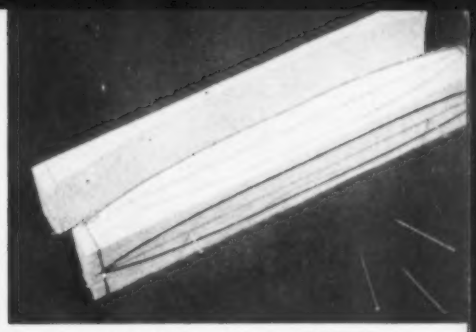
► Built solely for high altitude research at speeds in the region of Mach-3 and estimated to be capable of 2,250 mph at 30,000 ft., Bell's rocket-powered X-2 is designed to probe the so-called "heat barrier" where ultra-high speeds at which heat, generated by skin friction, is so severe as to soften and weaken the aluminum alloys hitherto used in aircraft construction. To this end, the X-2 employs stainless steel and monel in its construction and carries numerous recording instruments.

Our model is built to a scale of 1 in. to 6 ft. (1/72) and was drawn up from three-views kindly supplied by the Bell Aircraft Corp. The model is simple to construct as the accompanying picture sequence shows.

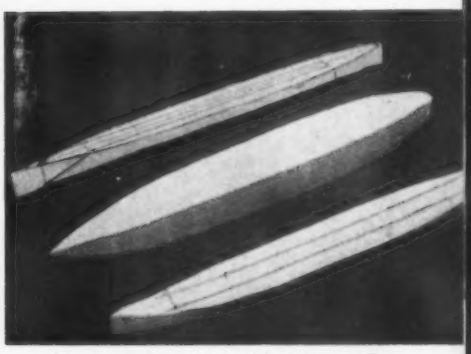
First trace the outlines of the fuselage blank onto a 1 in. x 1 in. x 6 in. hard balsa block. A ball pen is best for making clean lines. Cut around the outlines with a suitable saw. We used a power jigsaw, but a coping saw, if not so speedy, will do just as well. Saw the sides first, then replace the pieces by pinning them together and saw the top and bottom. Retain the top and bottom offcuts and mark out on them the cockpit and skid fairings.

Use 3/16 in. hard balsa sheet for the wing and fin and 1/16 in. aircraft plywood or hard balsa for the stabilizer. The wing is dihedraled on the under surface only; therefore, taper the wing thickness to 3/32 in. at the tip after marking guide lines as shown.

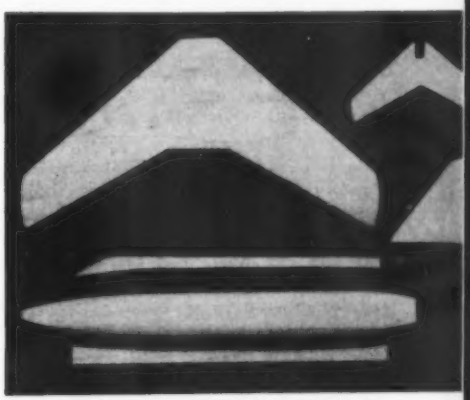
Carve and sand the fuselage to an aproximate circular section, leaving a flat portion top and bottom and cut out to accommodate wing as shown. Fit



1. Mark out block from plan. Saw sides, replace pieces by pins, saw top, bottom.

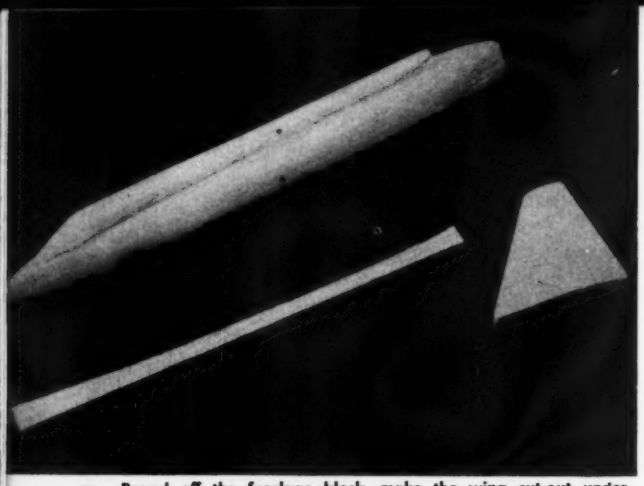


2. Use scraps from top and bottom cut-offs for skid, cockpit fairings. Ball-point pen.

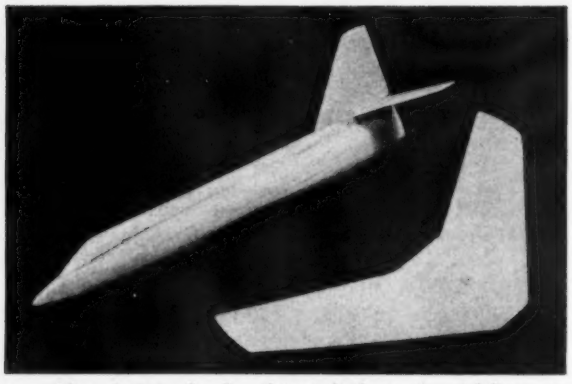


3. Simplified construction of our X-2 requires little carving. A good starter.

4. Wing dihedral obtained by tapering the bottom surface. Then sand to rib section.



5. Round off the fuselage block, make the wing cut-out underneath, then add the cockpit streamline piece and shape up.



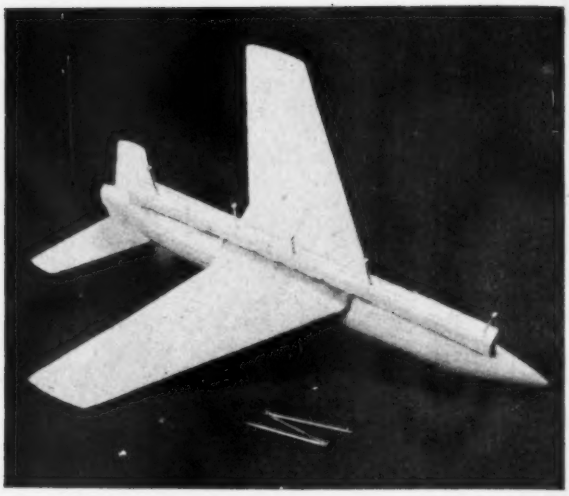
6. After shaping the fin, slot at back so the stabilizer can slide into place. When tail installed, line up with care.

cockpit fairing and round off to shape. Slot fin, sand to symmetrical section and cement in place. Add stabilizer after sanding to streamlined section. Align tail surfaces carefully. Fit wing, using plenty of cement, after making sure it is a snug fit in the fuselage bottom, then add skid fairing. When dry, carve and sand the skid fairing to shape and round off the wing roots to fair into the fuselage at the trailing edge.

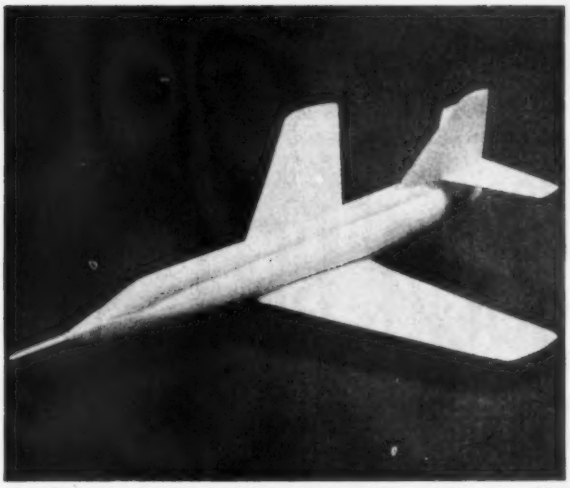
Now go over the entire model with fine sandpaper, shaping up any imperfections and add the fillets of plastic wood at the wing roots. Give the entire model two or three coats of sanding sealer, sanding down between each coat, until the grain is no longer visible and a smooth, even surface is obtained. Then give a coat of clear dope. Wing fences can be added at this stage, using shim metal or white card or, better still, thin white celluloid.

The ship should be doped white. Use a really soft brush (sable or camel hair) for best results, or spray. For a truly professional finish, apply three or four coats, rubbing down between each with fine wet-or-dry paper, using the paper wet and with a touch of soap for lubrication. Finish off with a polishing compound.

A sleek model like the X-2 makes an attractive modern ornament and, as such, can be left in its plain white color, mounted as shown on a simple piano wire stem attached to a suitable base. Otherwise, mark cockpit outlines, painting windshield silver and the nose panel black, and outline control surfaces with black or dark gray dope in a ruling pen. Note that an "all-flying" stabilizer is employed and no elevator hinge-line, therefore, requires to be marked. Finally, add star decals and Air Force letters.

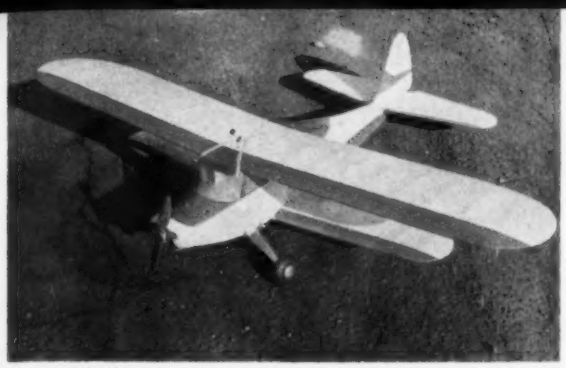


7. Add wing, using plenty of cement. Attach the skid fairing, sand to shape. Trim carefully with single-edge razor blade.

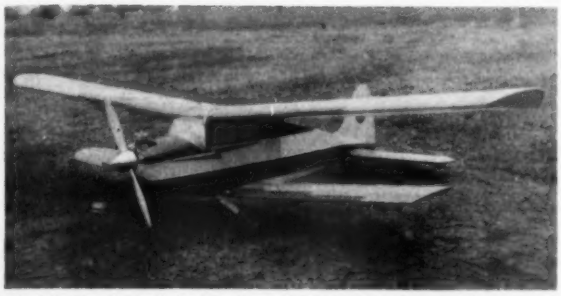


8. Go over the entire model with fine sandpaper. Make wing fillets from Plastic Balsa. And don't nick the wood with finger-nail.

9. Apply three coats of sanding sealer, sanding with finest paper between each, followed with a clear dope coat then white colored.



Marty Seil's bipe has 49 in. top span, 34 in. lower span, on .15. Job uses deBolt two-channel, multi-serves, and weighs only 3½ lbs.



Schmidt five-channel in 5¾ lb. L. W. Cruiser bipe by deBolt. Upper wing spans 65 in., lower 48 in. Fox .35 and has multi-serves.

Simulated launch of a Dale Root Ascender, by builder Ray Swartsel, of Pinole, Calif. Root used Babcock 3-channel, performs true spins.

Radio Control News

By E. J. LORENZ

Though it remains a distinction to fly rudder-only properly, electronics progress is ahead of pilotage. Here is the very latest.

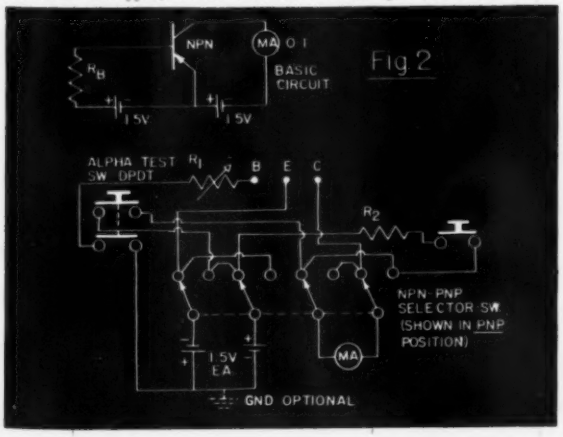
TECHNICAL TOPICS

► In our write-up of the Transistorized Power Converter, given in the June Issue of MAN, we stated that the output ripple frequency was 120 cycles. This was our mistake since the unit operates at approximately 5,000 cycles, thus making the output frequency of the bridge rectifier 10,000 cycles. This was brought to our attention by Bob Elliot, Box 278, Pittsfield, Mass.

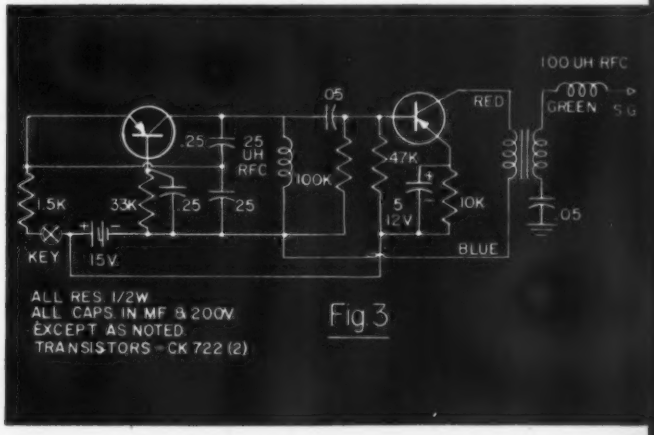
It is often very difficult to translate sketches and information from overseas sources and get the exact information into this column. Such was the case with the Stegmeir vacuum control system. Fig 1 shows the complete actuator system and we wish to point out that this is a reliable system, although certain precautions must be taken. First of all, no 'sloppiness' in building it can be tolerated. Secondly, the unit must be protected from dust during storage and operation. Last but not least, this is a true vacuum system having many advantages over a pressure system. Some of our original sources stated that it could be operated with pressure, which is true. However, vacuum is much more reliable and the valving action is easier and simpler. This system is being used in Europe with much success, and we're looking for the first signs of someone building a unit over here.

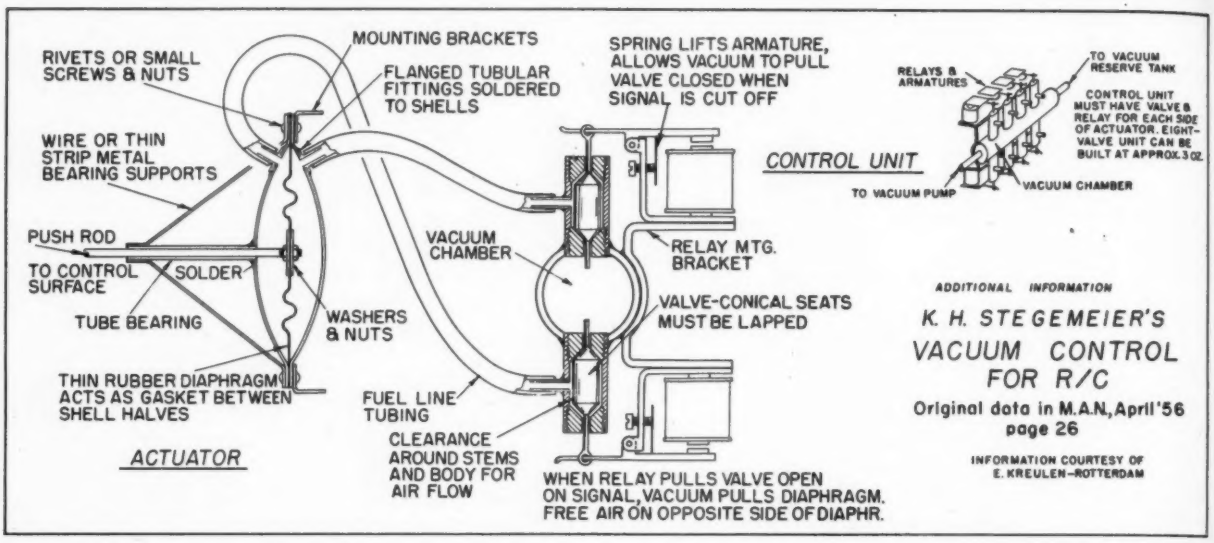
Before getting into something new, there is one last item to clean up on information given previously. The Tran-

Schematic for a transistor tester, designed by E. Chapman. Good for NPN and PNP types, allows selections between good, bad transistors.



Transistor modulator, idea by D. Berlanger. Compact modulator for MOPA transmitters but not recommended for use with reed receivers.




RIVETS OR SMALL SCREWS & NUTS
MOUNTING BRACKETS
FLANGED TUBULAR FITTINGS SOLDERED TO SHELLS
SPRING LIFTS ARMATURE, ALLOWS VACUUM TO PULL VALVE CLOSED WHEN SIGNAL IS CUT OFF
WIRE OR THIN STRIP METAL BEARING SUPPORTS
PUSH ROD
TO CONTROL SURFACE
SOLDER
TUBE BEARING
WASHERS & NUTS
VACUUM CHAMBER
RELAY MTG. BRACKET
VALVE-CONICAL SEATS MUST BE LAPPED
THIN RUBBER DIAPHRAGM ACTS AS GASKET BETWEEN SHELL HALVES
FUEL LINE TUBING
CLEARANCE AROUND STEMS AND BODY FOR AIR FLOW
ACTUATOR
WHEN RELAY PULLS VALVE OPEN ON SIGNAL, VACUUM PULLS DIAPHRAGM. FREE AIR ON OPPOSITE SIDE OF DIAPHR.
CONTROL UNIT
RELAYS & ARMATURES
TO VACUUM RESERVE TANK
CONTROL UNIT MUST HAVE VALVE & RELAY FOR EACH SIDE OF ACTUATOR. EIGHT-VALVE UNIT CAN BE BUILT AT APPROX. 3 OZ.
TO VACUUM PUMP
VACUUM CHAMBER
ADDITIONAL INFORMATION
K. H. STEGEMEIER'S
VACUUM CONTROL FOR R/C
Original data in M.A.N. April '56 page 26
INFORMATION COURTESY OF E. KREULEN—ROTTERDAM

Latest corrected drawings pneumatic system by the German Stegmeier. System should work on vacuum only, according to foreign correspondents.

sistor Power Converter given in the June issue is working very well for those who have followed instructions. Although the winding data was given, it was mentioned that a special core must be used. It is impossible for this unit to operate if the special core, supplied by B & S Products Co, Mercer Island, Wash., is not used. DO NOT attempt to place the windings as shown on the schematic on a regular small bobbin. The best solution is to buy the ready-made transformer, either separately or already mounted on the printed-wiring chassis.

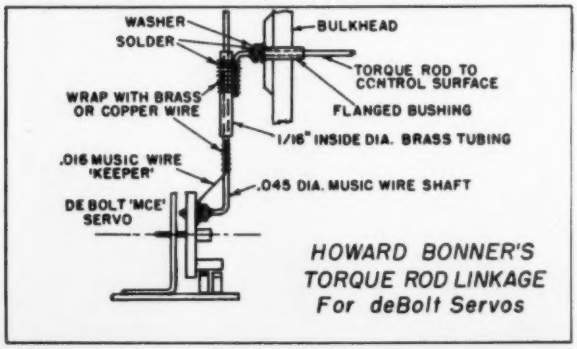
How about the transistor that has been kicking around in your scrap box? Is it a good one? If you're not sure, why not build up the Transistor Tester shown in Figure 2. This unit was designed by E. Chapman, Crestwood Blvd., Poughkeepsie, N.Y. and it is capable of checking both NPN and PNP types. The transistor is tested for alpha prime and shorts and the two 1½ volt batteries should provide service for the length of their shelf life, depending upon the use of the tester. The original unit was built in a small Mini-Box, measuring about 2⅜" x 3" x 5¼", used conventional parts, and the circuit was not critical as to location of the parts. Flea clips or sub-miniature sockets may be used for holding the transistor during tests. All switches are of the momentary contact type. The purpose of R_2, a 3k resistor, is to limit meter current in the event of a short. If an inexpensive meter is used, this resistor may be eliminated, since the internal resistance of an inexpensive meter is high enough to avoid damage. The variable resistance, R_1, is a 25k or 50k pot, used to adjust base current to 10 microamps (resistance is generally 15k and could be fixed). When the base current is adjusted to 10 microamps and the meter used is a full scale 0-1ma unit, the collector current multiplied by 100 will give the alpha reading. This unit should enable you to select between good and bad transistors since, unlike vacuum tubes, you seldom get a second chance to make a mistake with a transistor in a circuit.

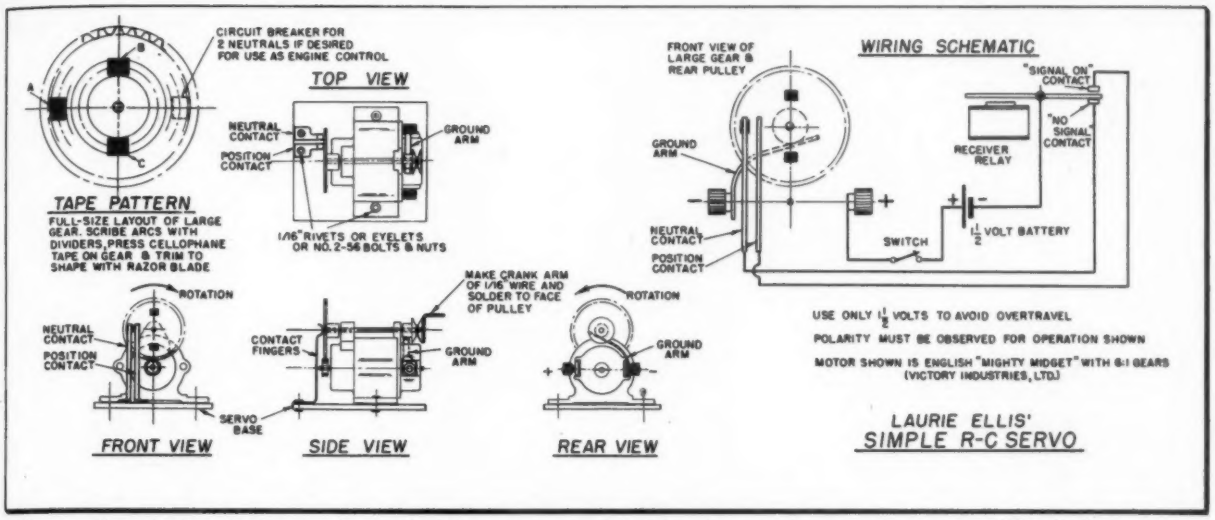
Fig. 3 gives the circuit for a transistor modulator, as devised by D. Berlanger, 2222 Brown Street, Alton, Ill. A sub-miniature tube version was given in the June 1955 issue of MAN. Although the original circuit called for CK-722 transistors, we had good results using GE 2N107 type transistors. The small, high-capacity capacitors are obtainable through Lafayette Radio, 100 Sixth Avenue, NYC. This design makes a compact modulator which will drive a low-powered MOPA transmitter. It will operate practically any tone actuated receiver. Due to the temperature/drift characteristics of the transistors, it is not recommended for reed receiver work.

How about that FCC registration you were going to send in? Although the registrations on file with the FCC have been on the increase, there is still a long ways to go before we hit even the half way mark, with regard to the actual number of RC flyers and operators around the country. You might be able to make the dream of additional frequencies come true if you file with the FCC at once.

Relays come and relays go, but the Sigma 4F, 5F and 26F are still top choices for dependable operation under adverse operating conditions. In checking various installations from time to time, we've run into other type relays which had the nasty habit of allowing the armature to fly loose after a hard landing, did not give sufficient relay contact pressure for reliable operation and were difficult to adjust. The last two problems could be overcome by careful cleaning of the points prior to placing the relay in a protective housing, and by patience in obtaining the proper adjustments. The first problem, however, of keeping the armature in place is a more serious one and observation has shown that correct mounting of the relay will minimize this fault. As we have mentioned before in this column, shock mounting a receiver or relay with a very resilient medium can often be as bad as no shock mounting at all. By this we mean, rubber bands or foam rubber, so placed as to allow (*Continued on page 62*)

Thanks to the Larks Newsletter, this interesting detail shows how to use servo with standard torque-rod system for moving a control.

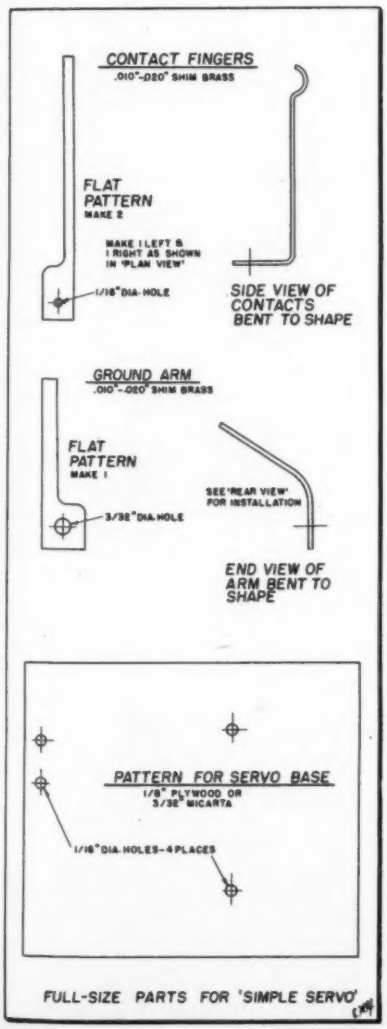


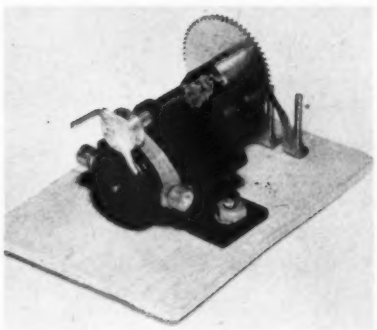

CIRCUIT BREAKER FOR 2 NEUTRALS IF DESIRED FOR USE AS ENGINE CONTROL
TOP VIEW
NEUTRAL CONTACT
POSITION CONTACT
GROUND ARM
1/16" RIVETS OR EYELETS OR NO. 2-56 BOLTS & NUTS
TAPE PATTERN
FULL-SIZE LAYOUT OF LARGE GEAR. SCRIBE ARCS WITH DIVIDERS, PRESS CELLOPHANE TAPE ON GEAR & TRIM TO SHAPE WITH RAZOR BLADE
ROTATION
NEUTRAL CONTACT
POSITION CONTACT
FRONT VIEW
CONTACT FINGERS
MAKE CRANK ARM OF 1/16" WIRE AND SOLDER TO FACE OF PULLEY
GROUND ARM
SERVO BASE
SIDE VIEW
ROTATION
GROUND ARM
REAR VIEW
FRONT VIEW OF LARGE GEAR & REAR PULLEY
WIRING SCHEMATIC
"SIGNAL ON" CONTACT
"NO SIGNAL" CONTACT
RECEIVER RELAY
GROUND ARM
NEUTRAL CONTACT
POSITION CONTACT
SWITCH
1½ VOLT BATTERY
USE ONLY 1½ VOLTS TO AVOID OVERTRAVEL
POLARITY MUST BE OBSERVED FOR OPERATION SHOWN
MOTOR SHOWN IS ENGLISH "MIGHTY MIDGET" WITH 6:1 GEARS (VICTORY INDUSTRIES, LTD.)
LAURIE ELLIS' SIMPLE R-C SERVO

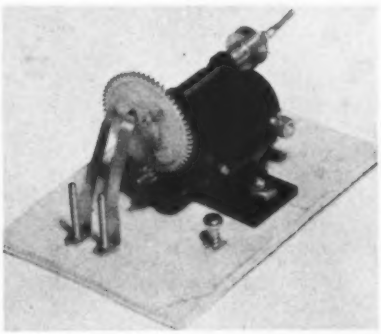
Compare these details with the two photographs below, the one on left being the rear view, and the one on right, the front view.

home made Servo

This simple electric-motor servo has done well in western Canada. Make it yourself—or does it give you ideas?


CONTACT FINGERS
.010"-.020" SHIM BRASS
FLAT PATTERN
MAKE 2
MAKE 1 LEFT & 1 RIGHT AS SHOWN IN "PLAN VIEW"
1/16" DIA. HOLE
SIDE VIEW OF CONTACTS BENT TO SHAPE
GROUND ARM
.010"-.020" SHIM BRASS
FLAT PATTERN
MAKE 1
3/32" DIA. HOLE
SEE "REAR VIEW" FOR INSTALLATION
END VIEW OF ARM BENT TO SHAPE
PATTERN FOR SERVO BASE
1/8" PLYWOOD OR 3/32" MICARTA
1/16" DIA. HOLES-4 PLACES
FULL-SIZE PARTS FOR 'SIMPLE SERVO'





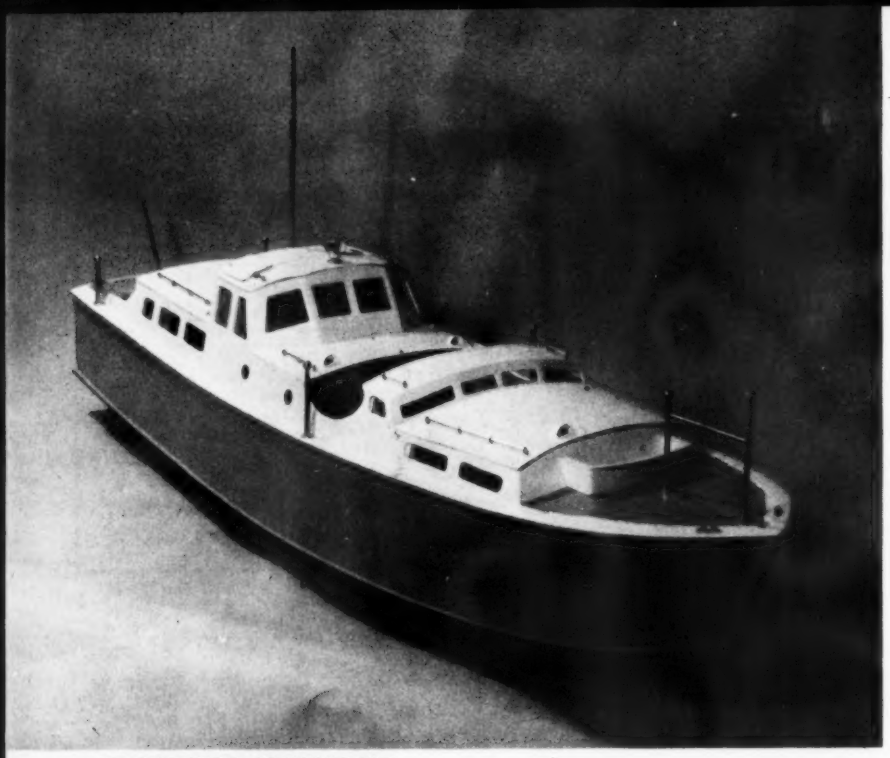
By LAWRENCE E. ELLIS

► This simple motor-control actuator will not skip and it does not suffer from vibration. It is very positive in action and, as long as the receiver is operating, it will do what it is supposed to do. The radio lads in the Winnipeg, Manitoba area have cast aside single-channel escapements and are using only this servo. The unit can also be used in conjunction with multi-channel control.

The motor used in the original unit is the Mighty Midget manufactured by Victory Industries (Surrey), Guilford, England, and available through better American hobby shops. The motor comes complete with a large gear wheel on one end and a small pulley on the other. Cut a small strip of shim brass, about ⅛" wide, to run from the negative terminal to the under-side of the pulley sleeve. Install this strip, then bolt the motor to a piece of ⅛" plywood, or 3/32" micarta. This can be of a size to suit the individual but it will be a part of the unit, thus should be sized so that when mounted in the model, it cannot move because of back-lash from the rudder.

Cut and mount two strips of shim brass to act as contacts bearing against the large gear wheel, as shown in the diagrams. Stick on three small pieces of scotch tape in positions indicated in diagram. Note the position of these pieces of tape in relation to the center line of the gear wheel. The pieces of tape act as circuit breakers. Other material, such as masking tape, may be used, but scotch tape has been found best.

Solder a 1/16" diameter wire crank on to the fact of the pulley. This should be positioned so that when the shim brass wiper No. 1 is resting against the scotch tape circuit breaker A, the rudder will be neutral. It doesn't matter whether the crank is to the bottom or top of the throw, but it will be necessary to remember which sequence or pulse rate to use. This is explained later. *(Continued on page 55)*



GLOW-POWERED ADMIRAL'S GIG

how to finish a Boat

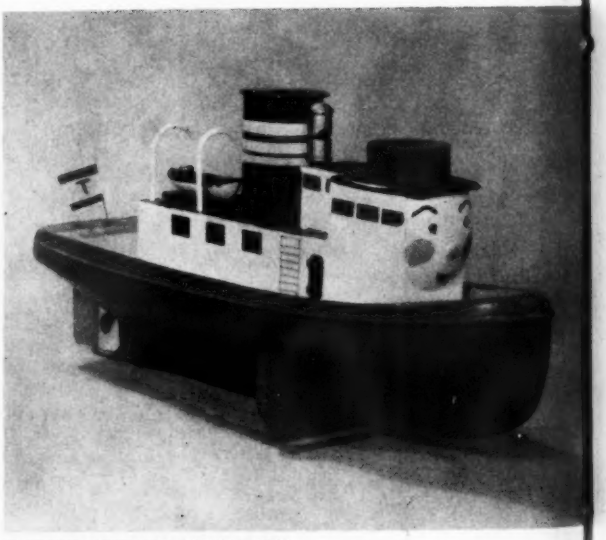
By WILLIAM BECHER

GLOW-POWERED ADMIRAL'S GIG: Sides, bottoms, cabin tops, 1/16 in. birch plywood. Cabin sides ⅛ in. mahogany ply. Front deck, separate strips, 1/16 x ¼ in. bass. Hull, cabin, covered with Rayspan. Eight primer coats Aerogloss balsa filler. Red bottom, white top sides, gray sides. Spray last coat, no rub. Forward, aft, decks Floquil Oak Stain, then eight coats clear dope.

ELECTRIC-POWERED LITTLE TOOT: Tissue-covered balsa hull. Shellac as sealer (six coats) and to stick tissue. The finish coats are house paint, as shutter green bottom. Whistle turned from dowel in drill, painted brass.

TUG BOAT HULL: Hull is planked with balsa strips, balsa bow block. Covered with lightweight tissue. Has a total of 12 coats of Testor's Sanding Sealer, brushed.

WORKING MODEL BLUEBIRD: Short section of cowling behind windshield from Celestic. Painted with 15 coats of Aristocraft Sanding Sealer, followed by six coats of Testor's True Blue dope. Last coat is rubbed down and waxed. Decals made from Trim Film, which works as would a decal. Power is by a Jetex Jetmaster. The real boat is the holder of the world's speed record.



ELECTRIC-POWERED LITTLE TOOT

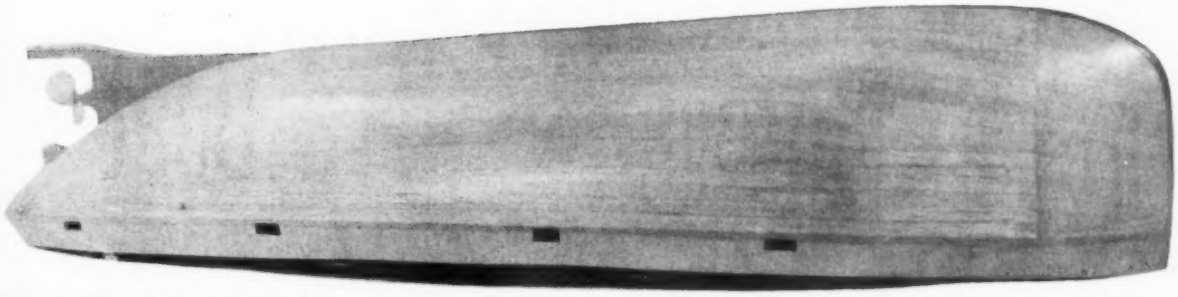
A few extra hours spent on the finish of a model boat will add years to its life. And, as in prototype practice, an annual paint job will keep it ship-shape and seaworthy. Boat finishes break down into three general types, each type depending on the material used to build the boat. These types are: all balsa or balsa and mahogany, plywood construction, and plastic models of different types. Type of finish also depends on the type of motive power used to drive the boat.

The materials used for a good finishing job include a selection of various grades of sandpaper—and lots of it. While on the subject of sandpaper, a word of advice. Don't use it! Most good hardware stores carry sheets of a fine grade of finishing paper called, "Open Coat Garnet Paper." Ordinary sandpaper has grains of abrasive packed closely together, causing it to load up with wood dust and paint rather quickly. The Garnet Paper has grains spaced further apart. It has less tendency to load up and form lumps which gouge the surface being sanded. Grades of Garnet Paper on hand should include Grade O for rough shaping, and really rapid removal of excess stock. For the smoothing operation, you might try Grades 3/0, 6/0, and 8/0. For the final rubdown of the paint job, wet or dry finishing papers used wet are best. A sheet each of Nos. 320 and 400 will do for a start. (The highest number, 400, is the finest grit.)

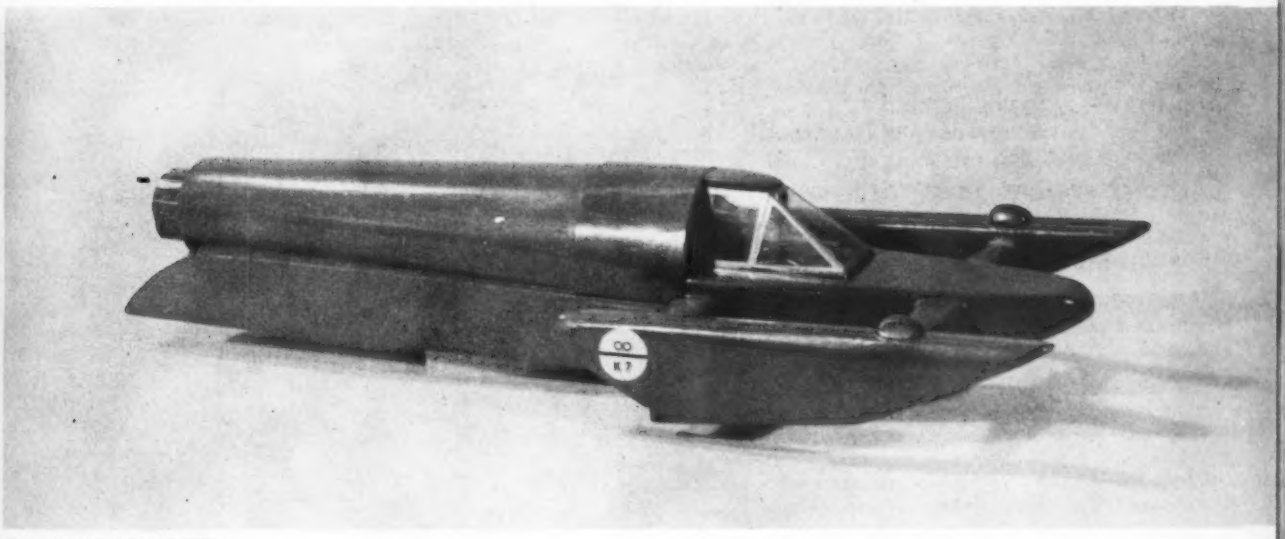
A good brush can make or break a paint job. And a good brush will last for many years. A lot of hours of extra

How to paint and finish an airplane is old hat to most hobbyists. But boats? Well, sir, these guys sure do not water down the work. Better pigeonhole this information.

Apply the tips in the article to your radio-controlled boat, end up with trim craft like this Veco Tug. Many makes, kits, to pick from.



TUGBOAT HULL READY FOR DOPING



JETEX-POWERED BLUEBIRD

work can be avoided by staying away from the camel hair brushes which shed hairs on to the work being finished. Instead, invest in a few sable brushes from an artists' supply store. They are tools, and, as with tools, the better grade you buy, the longer they will last. A good selection would include one No. 0, numbers 4 and 8, and one or more each of ½", 1" and 1½" wide brushes. To keep brushes in good shape, *always* clean them immediately after each use. For the final rinse (especially if you must use camel hair brushes), keep a separate jar of the appropriate thinner to which has been added a few drops of castor or olive oil. It keeps the bristles from becoming brittle and snapping off next time you use the brush.

Many different types of finishing materials may be used: nitrate dope and lacquer which are not fuel-proof, and butyrate dope, acetates and synthetic auto enamels, which are hot fuel-proof.

For painted hulls, filler materials include the various sanding sealers and the home brew talc and clear dope mixture. For natural mahogany hulls and decks, a paste filler available in paint stores should be used. It comes in different shades and performs the dual function of staining and filling the grain. By following the directions on the can and working carefully, it is possible to get a finish that will rival the smooth surface of a fine piece of furniture.

An appropriate finish to use on top of the paste filler is one of the new, synthetic, *(Continued on page 59)*

What do you look for in a model airplane fuel?

Whether you do stunt, contest, or just-for-fun flying, you probably are most interested in the very best possible all-around performance that a fuel can give to your engine. And that's exactly the reason why more and more modelers — novices and veteran flyers alike — prefer Testor's "39," the outstanding all-purpose fuel for all standard model glo engines! See for yourself on any basis of comparison you choose. Check it for easy starting . . . all-weather performance . . . power output . . . quality and quantity of lubrication. You'll agree that Testor's "39" makes flying more fun . . . gives you the dependable operation you want under every flight condition. It's a safe fuel, too . . . formulated to protect your engine and insure you more hours of enjoyable, satisfying flying time. Records? Testor's "39" holds them in both speed and endurance classifications! Get "39" now. You'll find the familiar red, yellow, and blue cans at dealers everywhere . . .

TESTORS

TESTOR CHEMICAL COMPANY • ROCKFORD,

- ½ PINT 50¢
- PINT 85¢
- QUART $1.50

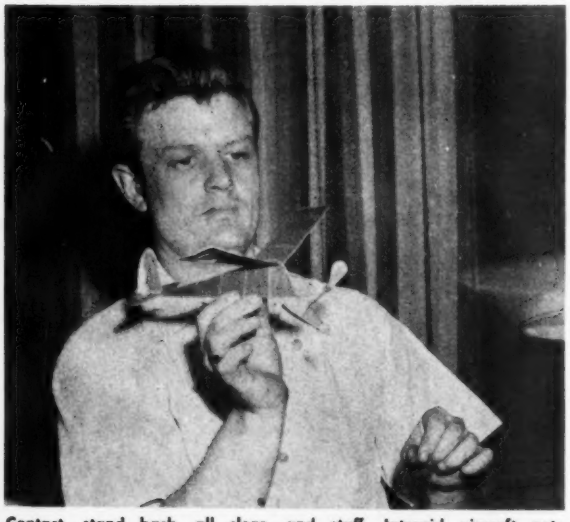
EUROPEAN SALES OFFICE: STOCKHOLM-STOCKSUND, SWEDEN

parlor Fly

Flying fields, airship docks? Who cares? You can put this mighty midget through paces without leaving your chair!

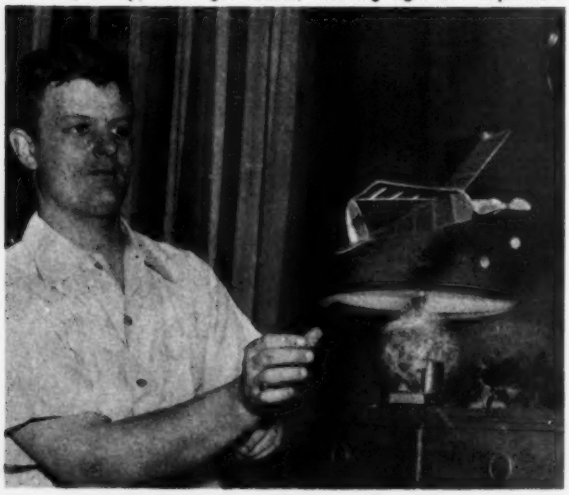
By ARTHUR SILBERBURG

Of course, you do have to wind it! This calls for concentration and a gentle hand. From four to ten room-size circles are the reward.



Contact, stand back, all clear, and stuff. Intrepid aircraft gets off with faint whirr. That prop is so going—camera stopped it.

Steady, boy, steady! To get technical, right wing reveals wash-in, or twist, at tip; also right rudder, meaning tight-turn adjustment.



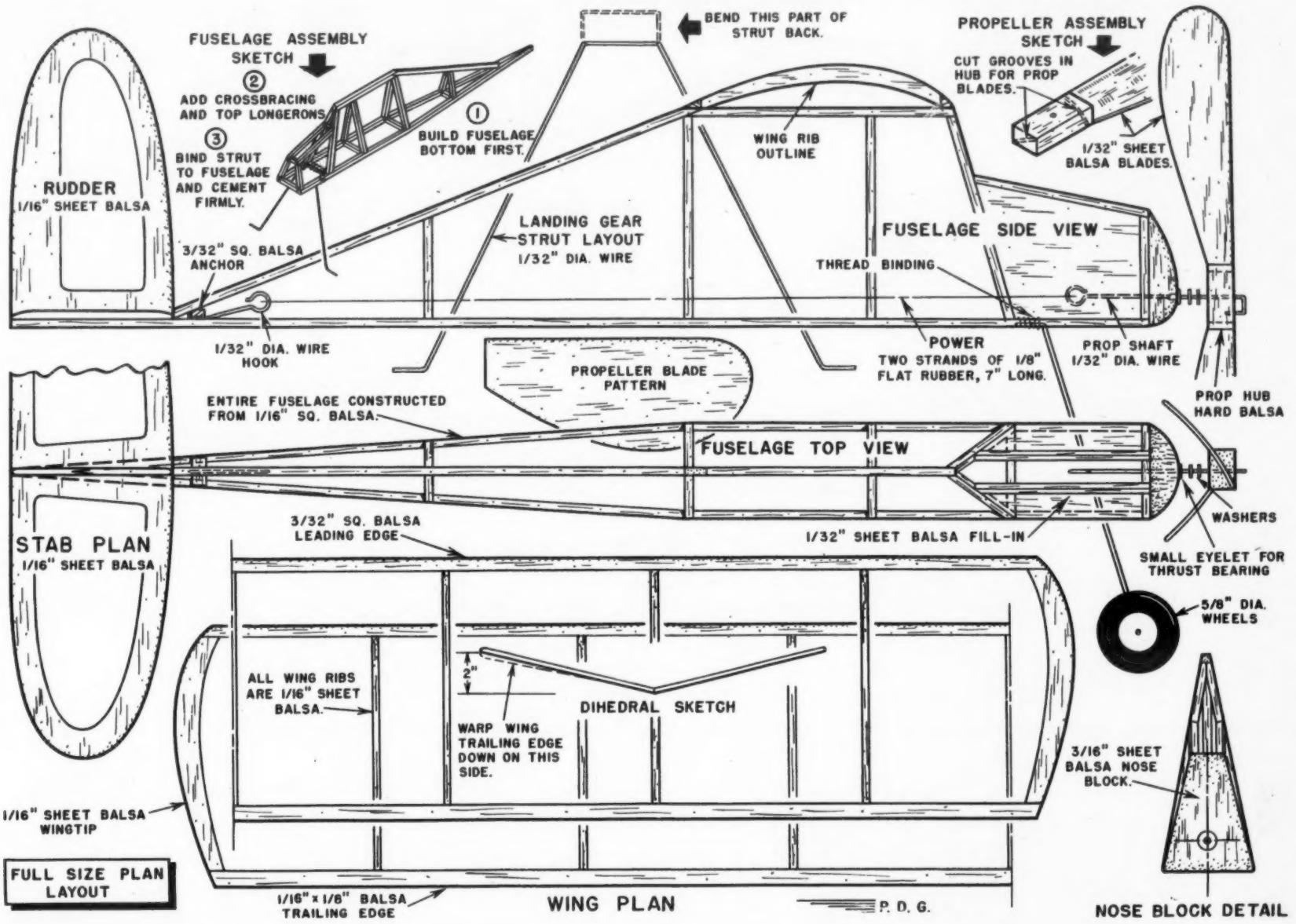
► I had good reason for building the "Parlor Fly" and I'd like you to know about it, too. It seems that whenever the relatives are over to the house, and admire the balsa handiwork, there is usually a remark that sounds like this; "Let's see one of those big things fly. You have enough room in the backyard!"

Then, you have to go through a long-winded explanation on why you can't and how they'll just have to be satisfied with a visual inspection. So that's the reason for the "Parlor Fly." I wanted something I could fly around the parlor. Not only does it delight the visitors but I've found I had loads of fun with it myself.

Needless to say, the simplicity of the construction permits both the beginner and accomplished, to finish it in about two days spare time, or three to four hours building time. The building instructions follow:

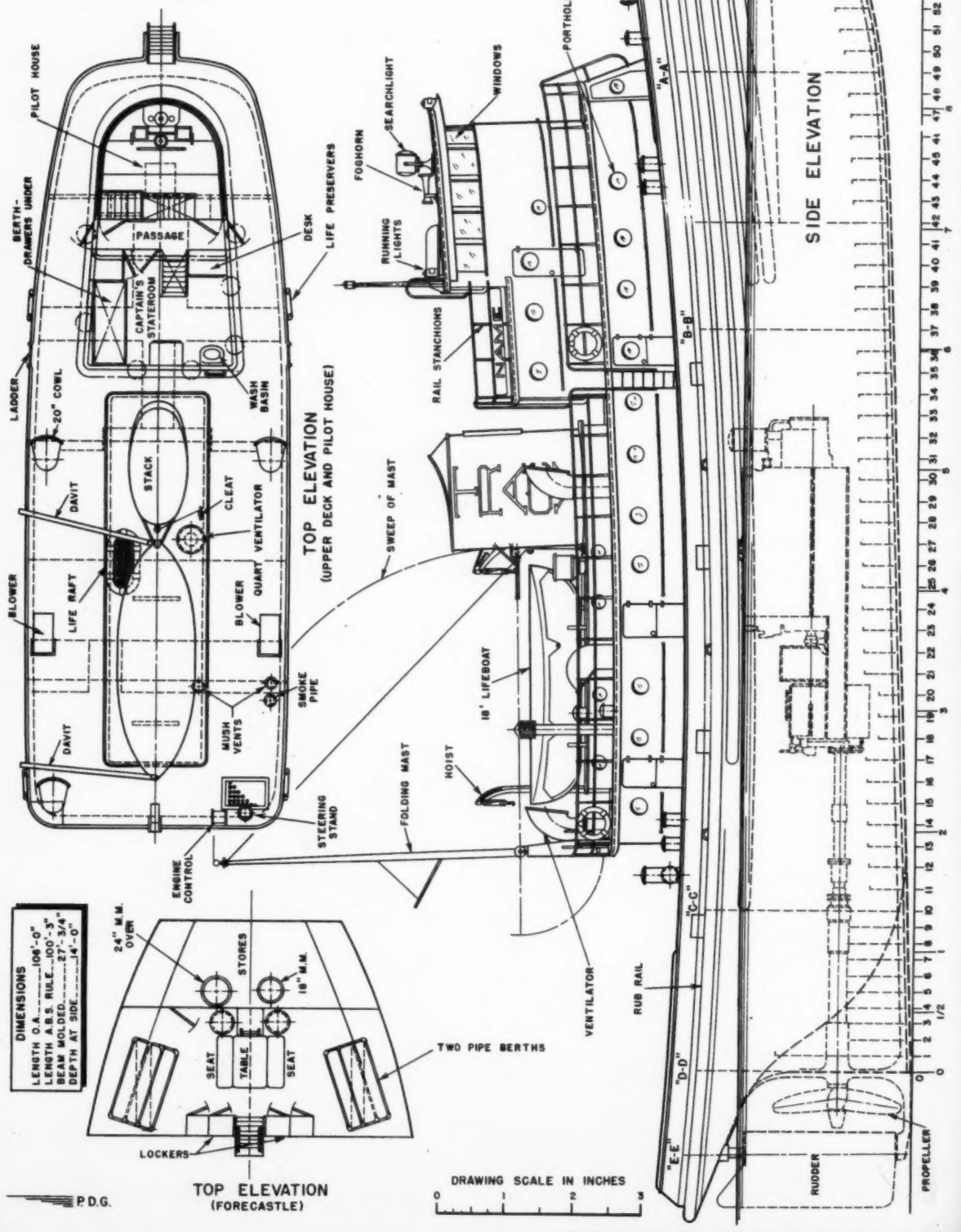
First assemble all the material needed. Use a good grade of balsa and the 1/16″ strips should be quite firm. Lay out bottom crutch of fuselage on bench over wax paper, and build right on top of it. While waiting for that to dry, cement together the rudder. Next fashion the landing gear, rubber-band hooks, noseplug, propeller and wing ribs. When fuselage and rudder are dry, remove and lay out elevator and half of wing. The elevator is cut out of sheet balsa, but the wing is pinned to the bench. Place wax paper underneath. While waiting, cover rudder —one side only. Cement landing gear and rear hook to body. The propeller blades are curved by putting a thin layer of cement on the side that (*Continued on page* 57)

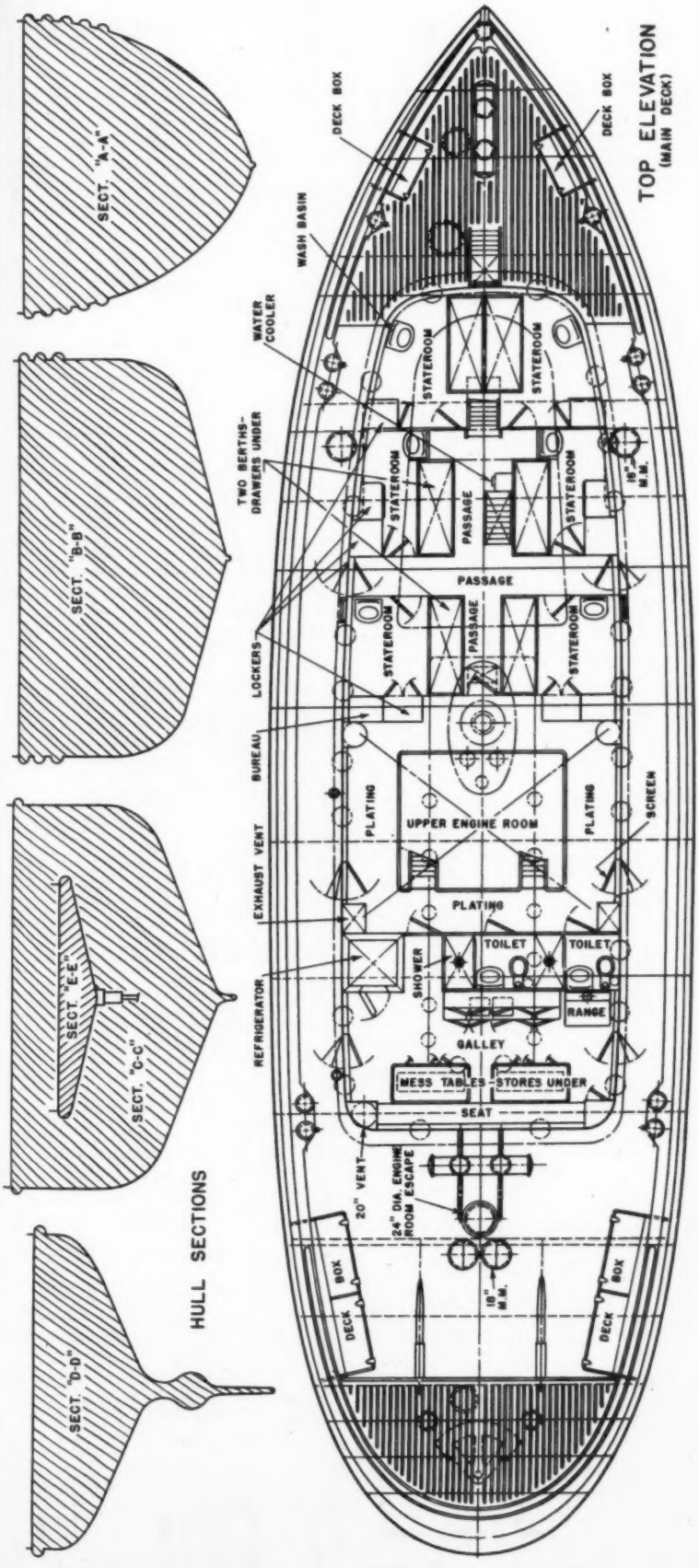
Carrier landings, yet! Still think that prop has not moved? Man! The pilot hasn't moved, though. This crate good when no fuel money.


FUSELAGE ASSEMBLY SKETCH
② ADD CROSSBRACING AND TOP LONGERONS.
③ BIND STRUT TO FUSELAGE AND CEMENT FIRMLY.
① BUILD FUSELAGE BOTTOM FIRST.
BEND THIS PART OF STRUT BACK.
PROPELLER ASSEMBLY SKETCH
CUT GROOVES IN HUB FOR PROP BLADES.
1/32" SHEET BALSA BLADES.
RUDDER 1/16" SHEET BALSA
WING RIB OUTLINE
LANDING GEAR STRUT LAYOUT 1/32" DIA. WIRE
FUSELAGE SIDE VIEW
3/32" SQ. BALSA ANCHOR
THREAD BINDING
1/32" DIA. WIRE HOOK
POWER TWO STRANDS OF 1/8" FLAT RUBBER, 7" LONG.
PROP SHAFT 1/32" DIA. WIRE
PROPELLER BLADE PATTERN
PROP HUB HARD BALSA
ENTIRE FUSELAGE CONSTRUCTED FROM 1/16" SQ. BALSA.
FUSELAGE TOP VIEW
WASHERS
STAB PLAN 1/16" SHEET BALSA
3/32" SQ. BALSA LEADING EDGE
1/32" SHEET BALSA FILL-IN
SMALL EYELET FOR THRUST BEARING
5/8" DIA. WHEELS
ALL WING RIBS ARE 1/16" SHEET BALSA.
2"
DIHEDRAL SKETCH
WARP WING TRAILING EDGE DOWN ON THIS SIDE.
3/16" SHEET BALSA NOSE BLOCK.
1/16" SHEET BALSA WINGTIP
FULL SIZE PLAN LAYOUT
1/16" x 1/8" BALSA TRAILING EDGE
WING PLAN
P. D. G.
NOSE BLOCK DETAIL

Helen L. Tracy

AN AUTHENTIC SCALE DRAWING
OF A REAL TOW BOAT.





NEW! JETCO'S '56
PAA-Load "ANGEL"

By Frank Ehling - designer of the PAA-MASTER and SPACEMASTER

Price Later

This BIG 48" span model is perfect for all the hot new .049 powerplants.

Jetco's '56 PAA-Load ANGEL has extra large wing area for a long floating glide. The kit includes die-cut sheet parts, shaped L.E. and T.E.'s, wheels, tank and decals

PAA-Load
JETFIRE

Price Later

For Jetex 150 unit

First kit for the NEW PAA-Load JET Class - by Frank Ehling. Meets official rules and has a wing span of 31"

JET TWINS
Gliders

35c

16" span model takes Jetex '35'

Two futuristic flying wings, with die-cut and color printed parts on top grade Jetco balsa. Ideal for group projects.

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Span 30"

Thermic "C" Glider

Span 36"
85c

Towline Type

This completely NEW version of the famous 'C' features improved construction and plans

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FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

South African Nationals

► The 1956 S.A. Nationals were held at Johannesburg. Weather was perfect, although perhaps too full of man-size thermals for comfort. The flying site was excellent and as good as one could expect to find anywhere. Noted Capetown modeler Pete Visser attended, along with the Western Province Club team (2000 miles there and back) and to Pete we are indebted for a really interesting letter on the meet from which we extract the following resume of events.

Payload: "This event is dying out here," says Visser, "and I can see no chance of revival. Designs are U.S. models and I saw no Diesel entries whatsoever. Indeed, there were very few Diesels throughout the Nats. *Radio-Control:* This is becoming popular and designs are varied. An R6B won, powered by an O.K. Cub .14." (R6B is a righ thrust-line pusher design of New Zealand origin—PGFC). "Control throughout was excellent and I saw no instances of 'lost control' or a single prang during the contest. Only 'rudder' was evident, although I believe one chap did have 'multi'. Radio gear was mainly American, with various original components by some entries.

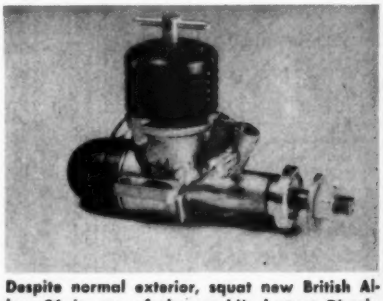
"*Speed:* From what I could judge, this is a has-been, although a few chaps still specialize in it." (Top speed was 153 mph in jet class—PGFC). "*Combat* did not seem to be as popular as last year. Flying wings all the rage, although a conventional design won. *Stunt:* Designs like Smoothie, Chief still popular, with occasional Barnstormer. Palmer's new Thunderbird is available, but kit price steep, (about $12.00). Stunt motor out here is the Fox .35. *Team-racing:* By far the most popular and the boys are pretty sharp in all classes. Pit work excellent.

"*Rubber:* Still confined to a few stalwarts. Wakefield a bit more popular than last year. Team (for World Champs) practically the same as last year (3 out of 4)." (Pete, himself, gained second place on the Wakefield team flying his reserve job—PGFC). "*Glider:* Another very popular event, with most jobs based on magazine designs. Auto-rudder almost universal, with more chaps than ever achieving overhead tow. Almost everyone flew Nordics and I saw only one big job—9 ft." (Visser took 4th place on A2 team—PGFC). "*Power:* The FAI class was popular, with standard of flying quite high. Torp .15 a standard fitting. VTO tried by a few. Winner was a Kiwi. Other free-flight classes were well supported. Most popular design appeared to be the Spacer, but the bigger jobs are losing out."

In general, the S.A. Nats were well supported by entries and it appears that some changes in the flying program will be required in future years in order to get through all the events in the time available.

British Nationals

After three consecutive years at R.A.F. Waterbeach, the British Nationals were this year transferred, at short notice, to the R.A.F. station at Hemswell in Lincolnshire. Organization was, nevertheless, good and the weather was generally favorable.



Despite normal exterior, squat new British Allen .06 is one of the world's hottest Diesels.

The final results sheets show several winning performances for the "names," along with some new blood making the grade. Most noteworthy were the performances of British and World record holder, Ray (Gadget) Gibbs in speed. Gibbs cracked his own British Class I (.15 cu. in.) mork of 123.5 mph with a resounding 127.5—only 1.8 mph below his world record mark flown on the FAI permitted undersize lines. In Class II (.30) Gibbs rcarned 147.1, which is slightly better than his British and World record. The motors used by Gibbs are specials

Nicely built Japanese PBY Catalina, U-control, powered by two Max .35's—pipe the pin-up.

German counterpart of American Ford was Junkers trimotor. Ju-52 job, three ED .21's.

built by Fred Carter, based, respectively, on McCoy 19 and Dooling 29 crankcase castings. Just how good these speeds really are, especially by British standards, can be judged from the fact that the .29 engined job was faster than the winning speed in the .60 class event.

The winning time for the 10 miles in the Class B team-race was 9:25, thus emphasizing the astonishing all-time record of 7:09 set up by the winner of last year's event. The Gold Trophy for aerobatics resulted in another win for Pete Russell—last year's winner.

In the free-flight section, rubber, glider and gas all required fly-offs to decide the winner. In f/f gas, high-climb exponent Tom Smith won with a fly-off time of 6:39. Glider event resulted in a win for R. Boxall with 6:34 and J. Cartright won the rubber class with a 6:54 fly-off. Payload specialist R. A. Ward won the PAA-Load event which was conducted under International class rules. Noteworthy double win was that of J. Nixon who took both the radio-control events.

Belgian International C/L Contest

The results of the 7th *Criterium d'Europe* control-line championships give an interesting foretaste of the speeds to be expected in the forthcoming World Speed Championships. Eight countries were represented. Spanish speed ace Battlo flew a modified Super-Tigre .15 to place top at an excellent 125.5, beating Britain's Gibbs by 1 mph. Next man up was some 17 mph slower than these two! Neither the Italian "works" Super-Tigre team, nor the Czech experts (who, between them, cleaned up last year's World Speed Champs) attended, and we wouldn't like to lay any bets, therefore, as to who will win this year's Championship, but the pace should be hot.

The team-race (.15 cu. in. International class rules) final was hotly contested between two Netherlands and two English teams and resulted in a win for Dutchman Smelt at an average speed of 64.4 mph, using a modified ED 2.46 converted to reed induction. Only *2 seconds* behind was Howard's Oliver-Tiger and another *3 seconds* separated Edmonds in third place (also Oliver Tiger) who had had to pit-stop for a broken prop.

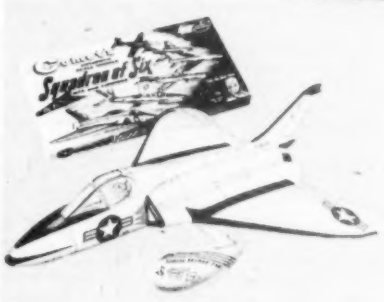
Incidentally, there is a movement afoot which favors transferring World Championship status from pure speed to team racing.

New Zealand—Another Bethwaite Record

Radio-control records are in the news again with both the glider and power world endurance records broken. That wizard of RC duration, Frank Bethwaite, is reported to have kept his glider aloft for no less than seven hours, thirty-seven minutes! We don't think anyone will bother to attack

(*Continued on page* 46)

Comet offers an ENTIRE FAMILY of PLASTIC Models



At 29c each—authentic **ALL-PLASTIC** scale models of famous jets and fighters, rich in detail, high-gloss finish in realistic colors. Complete with clear plastic pedestal, correct decals, simple plans, in colorful box. Approx. wingspan 5½".

Kit PL-1 Grumman Cougar F9F-6
Kit PL-2 North American Super Sabre F100
Kit PL-3 Lockheed Starfire F94C
Kit PL-4 Douglas Skyknight F3D
Kit PL-5 Douglas Skyray F4D
Kit PL-6 Republic Thunderstreak F84F

All six of the above models in Comet's full-color "Squadron of Six" box.....$1.69

At 39c each—sensational **ALL-PLASTIC** reproduction of full-scale jet bombers or executive planes, with all important exterior details. Clear plastic windows, authentic colors, decals, swivel pedestals, etc. Approx. wingspan 7". In vividly printed 4-color boxes.

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Kit PL-23 Piper Apache
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All six of these models in striking full-color box.....$2.29

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Sabre 44

This truly amazing **ALL-PLASTIC** control gas model has achieved tremendous popularity! Made of high-impact plastic, complete with ½ A Herkimer .049B gas engine. Nothing to build or assemble. Wingspan 14", length 14⅜", weight 5 oz.

10c

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"Set of Seven" jars in handy container ..... 69c Complete

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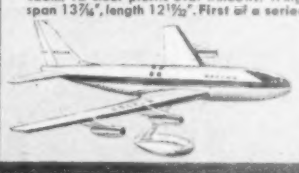
THE BOEING 707 STRATOTANKER

Another ALL-PLASTIC Comet true-to-scale triumph! 10-wheel landing gear, all important exterior details including forward pilot's cabin. 12 clear plastic oval windows. Wingspan 13⅞", length 12½". First of a series.



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In smart metal tube. Turns out better-looking plastic models; repairs plastic objects.

10c and 25c TUBES

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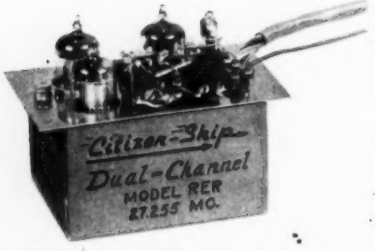
DUAL CHANNEL
Tone Modulated
REX Transmitter

The REX Transmitter is a 3 tube fully tuned and adjusted 27.255 mc tone modulated transmitter for multi-control of model planes and boats. MOPA Circuit. Right switch gives hi tone —Left switch gives low tone. Fixed tuning of tones requires no adjustments to match receiver selective filters. Long battery life.

Price..... $39.95

Citizen-Ship RER Receiver



The RER Receiver is a compact, lightweight, rugged unit which will selectively close one of two relays upon receiving the correct audio tone. Tuning is accomplished by built-in selective filters which are fixed and non-critical. The simplest, least troublesome receiver yet devised for multi-channel operation.

PRICE..... 39.95

INSTALLATION KIT FOR RER RECEIVER

Contains:
PLUG AND SOCKET WITH RUBBER SHIELD
500,000 OHM POTENTIOMETER
2 POLE SWITCH
PHONE PLUG AND OPEN CIRCUIT JACK
12" OF 8 CONDUCTOR CABLE

Model IRE..... $4.95

Also on 27.255 mc:	
FL Transmitter Kit	$19.95
FLX Transmitter	24.95
PR Receiver Kit	19.95
PLR Receiver	24.95
465 mc:	
CC-1 Transmitter	34.95
CR Receiver	29.95
AR Receiver	24.95
Citizen-Ship Accessories:	
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PSN Escapement	5.95
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Speed Control System (consists of SE, PSN, MSC)	17.50
Citizen-Ship Test Meter	22.95
Bell Crank and Rudder Horn	.75

Citizen-Ship
RADIO CORPORATION
820 E. 64TH ST. INDIANAPOLIS 20, IND.

Transparent Models

(*Continued from page 21*)

and rigidity, while the Saran will supply toughness and a superlative finish with no more weight than the normal number of coats of dope.

The structure of a model designed for use with paper and Saran should be fairly sturdy to withstand the combined pull of both materials. The ribs should not be too soft and at dihedral breaks should be cap-stripped to give adequate cementing surface for the Saran. The wing covering should be attached to the trailing edge and then wrapped around the leading edge in one piece to give a perfectly smooth entering edge. Gliders, rubber-powered models, and small powered models up to Half A class may be covered with light Jap tissue and household Saran. The number of coats of dope applied to the tissue can be varied depending on the degree of stiffness required. Larger models should use heavier papers with household Saran or the heavier Saran, which can be obtained from local food stores which have it in large rolls for wrapping.

On very large models or where great strength is required, a well-doped silk covering can be used with Saran as the finish coat. In most cases household Saran will prove to be perfectly satisfactory and will outlast the covering beneath it. I am still flying a glider whose paper covering is completely shattered due to the shocks of many hard landings. The Saran film is still intact.

All these techniques have been learned through tortuous mistakes, tests, trials and fun. The author would be very much interested in hearing from any readers using this new idea.

Man At Work

(*Continued from page 7*)

the inept? But, of course, the one question is as out of taste as the other.

• • •

► "We modelers in Western Canada think MAN does a fine job—supplies us with accurate and up-to-date information," Tommy Siddon, Drumheller, Alberta, reports. Mostly U-control, but free flight is catching on, thereabouts. Most supplies have to come by mail from Calgary. Oddly, much interest in flying wings . . . If you are in the neighborhood of Kingston, Canada, on September 23, suggest you take in the Eastern Canada Open. Notable experiment in that models are not restricted in area, weight, loading, or engine size. You can fly an RC in the free flight event if you want to—but on 15 second run. Only rules are 15 second run, hand launched; 164 foot line in towline, hand launching in rubber. Idea is to develop models for maximum duration, regardless of whether you build to rules or don't. Since 9 out of 10 modelers aren't concerned with rules, this could be interesting. Write Barry Heisman, 3290 Goyer Rd., 2 Montreal, Quebec. . . .

Plagued by lack of flying sites is the Bridgeport Aeronauts, now primarily an RC group. Monthly club meet with trophy at end of season. Insist on two rules: AMA license and FCC license for all transmitters. Calvin Hanks, 16 Buddies Terrace, Derby Ct. . . . Al Gasdia, K & B Allyn, tells us Class A record of 134.68 with the K & B .19. At same contest Bill Wisniewski pushed Open A up to 145.16 mph and that is really moving on a .19. A few years back you could win the Class D at the Nats with that kind of time. Any engine maker who'd like mention of a record set with his engine—just say the word.

Citizen-Ship
Announces
MSC
(Motor Speed Control)
The NEW way to secure ADDITIONAL control with SINGLE CHANNEL equipment

CONTACT CONTROL
Mounts on SE Escapement

Gives motor speed change with "Fast" Beep" on transmitter operate switch.

CONTROL VALVE
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Can't miss.
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Quick and Easy to Mount, Perfectly Suited to New or Existing Control Installations.

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Complete Speed Control System—Economy Package

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PSN Escapement
All for..... $17.50

The outstanding buy of the year in Escapements and Control Equipment

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. . . Article in the Midwest Modeler, 181 N. Cherry St., Galesburg, Ill., by Hank Chesko, who argues why should the Duoline boys have to buy new equipment to compete with the Mono-line boys? Two classes, he says. What think? . . . Bob Tennenbaum, Bronx, N. Y. points out that, although the helicopter event has been dropped from the Mirror Flying Fair, they now have a novelty event, and you can still fly your animated palm tree in that event. Bob is helicopter editor on Flypaper, 1031 Pond Street, Bristol, Pa., whose publisher is Al Abrams . . . Have long had the urge to make a simple RC with just a Mills .08—can report that the Mills and the Rebel make a smooth flying combo. Tired multi-channel boys lick their chops. Remember the good old days, fellas? Very nice results, the boys tell us, with put together samples from Darwin (The Darwing) and Roberts (the Fairchild). Roberts has a fascinating bellcrank deal you have got to try. Our boys making a last stand on the flying site problem. Up in the back hills among the sandpits. Nobody builds houses in sandpits.

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are chosen by more champions, year after year after year than all other makes combined! Why? Because they deliver more pull per flight . . . more flights per prop! They give the kind of performance that champions have to have to BE champions! And they'll deliver that kind of performance for YOU, too! That's why fellows all over America tell us: "THEY'RE THE MOST!"

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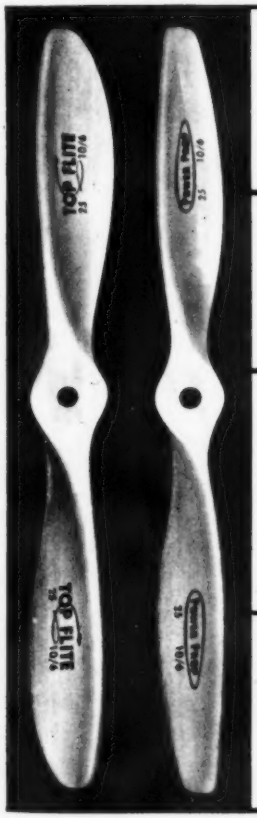

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POWER PROPS

Dia. and Pitch: 4½-6, 4½-7, 5¼-3, 5¼-4, 5¼-5, 5¼-6, 6-3, 6-4, 6-5, 6-6.

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POWER PROPS

Dia. and Pitch: 7-4, 7-6, 7-8, 7-9, 7-10½, 8-4, 8-5, 8-6, 8-8, 8-9, 8-10½, 9-6, 9-8, 9-9, 9-10½, 9-12, 10-6, 10-8.

25¢ each

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Dia. and Pitch: 11-4, 11-6, 11-8, 12-5, 12-8, 13-5½, 14-6.

POWER PROPS

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- made by the makers of famous "Jigtime" and "Superform" Kits.

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PIPER SEA SCOUT

AN EXCITING Fly-it-Yourself SEAPLANE

SCIENTIFIC

2 BRAND NEW MODELS $1.95 EACH

TERRIFIC FUN! TAKES OFF AND LANDS ON WATER!

You fly this exciting seaplane U-Control (it's a cinch, too) from any pond, lake or even a small puddle. And no wet feet! You're standing on the shore all the time. The film strip above shows some of the terrific flying fun you can have with this new model. You'll love the way it taxis along the water . . . the exciting moment when it's airborne . . . the all-around flying performance. The model is all prefabricated . . . with a carved balsa fuselage and all parts cut or shaped for quick, easy assembly. A mere $1.95

BOTH MODELS HAVE AN 18" WINGSPAN • POWER WITH GAS ENGINES .035 TO .074

NEW!

A new flying sensation . . . our new

C-O-L-O-R-F-U-L

Golden Hawk

Here's the most C-O-L-O-R-F-U-L flying model you can imagine! The giant size 3-color decals (included) make this U-Control flyer a real dazzler. Note the B-I-G-G-E-R, expansive wing . . . here's much more model for your money, too. In performance, it's simply terrific! And so easy to assemble, it practically falls together from the all-prefabbed kit (carved fuselage & all parts cut or formed). Priced at a tiny $1.95

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Model speeds over 40 m.p.h. Direct wheel drive. Prefabbed formed body, rubber wheels.

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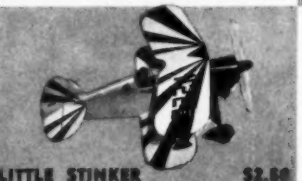

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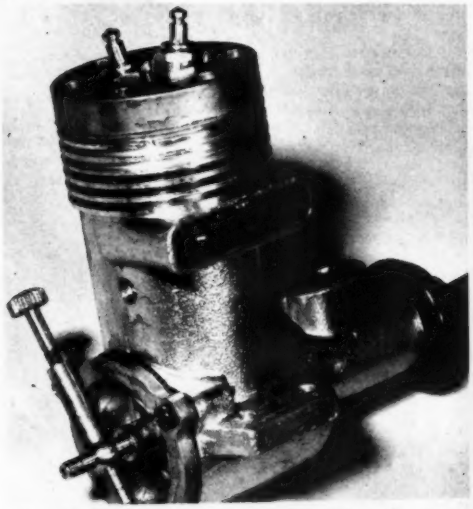
Engine Review

Fox 29R



Granddaddy of all venturis distinguishes the latest Fox. Double glow plugs spell reliability. In lower picture, rear needle for pen bladder tanks is seen.

By E. C. MARTIN

Designed expressly for racing, on "jungle juice" fuels, this new engine introduces new, and improved, features.

► There must be something in the theory of thought association because our first view of the exciting new Fox 29R brought back to us the heady smell of castor oil and burning rubber, the scream of tires and engines wound to disintegration. This may be a far cry from model airplanes, but when you look deeper the model racing engine has it all, pocket sized, and it plays on the same emotions. The new Fox has something in common with the mighty Offenhauser. It is big and hairy, completely purposeful, and it sounds like more than oil and metal can stand. In every feature it is a racing engine.

Size is the keynote of the 29R. The rather handsome looking ashtray on the front is, in fact, the daddy of all air intakes, and the skinny looking intake on the back is actually the needle valve assembly. The cylinder head boasts no less than two electric corks, and the manufacturer seems to be using up surplus .59 crankshafts. All this adds up to new standards of performance with a closely approached target of one brake horsepower, or two hundred BHP/Litre. This kind of steam has only been equaled by a few highly modified Dooling .61's in race cars, and never in any unblown engine in the full sized field. Getting such a performance from a .29, where the frictional losses are relatively higher, is a considerable achievement.

The 29R is a special-purpose competition engine designed entirely around nitrated fuels. It is only meant for jungle juice and is quite unexceptional on anything less. But, given the right brew, it is claimed to operate continuously at 20,000 RPM with a life span at least the equal of any other .29, and does not suffer from a lean run. The instruction manual includes a list of polishing operations and other tidying up modifications which the owner can carry out with simple tools in order to extract the last drop of power, although such work will not be necessary until the

(*Continued on page* 49)

Corben Super Ace

(*Continued from page* 15)

on a typical take-off and flight.

Imagine that we are at Arlington Airport (40 miles north of Seattle) on a warm spring morning. The trees around the perimeter of the field are dark green against a pale blue sky, contrasting sharply with brightly painted models in the air. Let's take the Corben out of the station wagon and walk over to the edge of the East-West runway where the model will have room to drift if the breeze is stronger aloft. If you'll fill the fuel tank, I'll connect the battery and check the 7 x 2 Tornado prop. Now a prime of fuel through the Cub's exhaust port and intake and we are all set. We turn the prop through compression several times and then flip the prop smartly as the glo-fuel starts to sizzle inside the cylinder. One more smart flip of the prop and the engine barks into life. A slight adjustment of the needle valve, the steady roar changes to a high pitched whine, and the plane tries to surge forward. Now we'll quickly snap on the top cowling, quarter the model into the slight breeze and release our hold on the fuselage.

The Corben bounces a bit on the rubber airwheels as it starts rolling on the blacktop runway. The tail skid comes up and the model accelerates quickly. One last little bounce, the wing tips bob in response, and the spinning wheels are lifted into the air. The ship climbs away from the ground in a wide left turn banking very slightly away from the runway. See the trace of blue exhaust smoke trailing behind the model!

The Corben continues to climb steadily higher, getting smaller by the second until it is just a minute speck directly over head. Darn, how high is that model going to get–We'll "thermal it" yet if the engine doesn't quit. Whew, I guess we are all right now. The engine stopped, but the model still looks awfully high. By the way, did you notice how the ship settled right down into the glide without stalling? Downthrust and the Center of Gravity well forward did that. Watch that glide carefully. It really looks good. Look at those cream doped wings flash as the model turns in the sun. Pretty, isn't it? Here it comes again, gliding overhead and turning downwind. Looks like it is going to land almost beside us when it comes back around.

The Corben approaches upwind gradually settling lower, and passes at shoulder height aimed for the runway. The wheels flick through some tall grass at the edge of the runway—a little lower and the airwheels bounce on the black top. The tail settles and the skid touches with a little scraping sound. The flight is over. Shall we fly it again?

When building the wing, note that the wing ribs are threaded onto the spars, so make the spar cut-outs accurately. Note too, that the leading edge planking extends over only the first few ribs, and from there on false ribs are used. This is patterned exactly after the real ship, as is the scale rib spacing. The wing should be held down with rubber bands around the fuselage until the model is adjusted, after which the wing may be permanently cemented down and the wing struts fitted. The little jury struts that show in the photograph are glued to the forward wing strut 1⅝ inches from the fuselage and strut joint.

The main structure of the fuselage is formed by the 1/16" balsa sheet sides. Add the 1/16" x 3/16" stiffeners on the inside face of each side before gluing in the bulkheads. The cowls under the wing are formed of 1/16" sheet balsa. This is a

(*Continued on page* 48)

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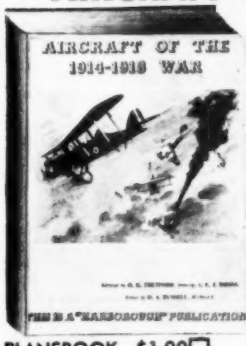

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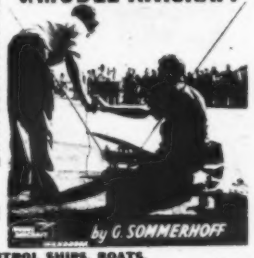

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Foreign Notes

(*Continued from page* 39)

that one for a long, long time.

Russia—New RC Power Record

Bethwaite's power RC record of 3 hr. 2 min. was recently broken by the Russian modeler, Peter Velichkovski, who added a few more minutes to set a new mark of 3 hours, six minutes and 38 seconds. Model used was a large shoulder-wing job of rather typical Russian design and was equipped with two-channel control.

World Free-Flight Championships

What is described by its organizers, the British S.M.A.E., as the "World's Greatest International Model Contest," will be in progress by the time this issue is on the newsstands. The FAI Free-flight Power Championships to be held this year at the R.A.F. College of Aeronautics, Cranfield, may well, in fact, make this claim on the score of world-wide representation. Among those countries which are expected to take part are: Argentina, Australia, Austria, Belgium, Canada, Czechoslovakia, Denmark, Eire, Finland, France, Germany, Great Britain Guatemala, Holland, Hungary, Israel, Italy, Mexico, Monaco, Saar, Spain, Sweden, Switzerland, U.S.A., U.S.S.R. and Yugoslavia. If, in fact, the Russians do send a team, it will be the first occasion on which they have competed with the Western countries in a meet of this type.

Cessna 310

(*Continued from page* 10)

pinned down to a flat, working surface. Sufficient care and patience to achieve proper fit and alignment here will guarantee a strong, warp-free basic structure. It may be advisable to note here that the airfoil section used on the model is fairly close, but not exact scale. We took the liberty of flattening the undersurface between the spars, to enable the wing to be built on the bench without excessive blocking-up.

The engine nacelle keels must be accurately cut from ⅛" plywood, and snugly fitted to both spars at the positions indicated. Before cementing them permanently in place, check carefully with a small triangle to insure their perpendicularity with the top of the main spar. The leading edge may now be butted against the nose of the ribs and carved and sanded to the cross section shown at each rib station. *Do not shape the leading edge for the length of the center section*—the basic rectangular shape provides more glue area for the joint between it and the fuselage for greater strength.

The entire control assembly—bellcrank, bellcrank mounting block and lead-out wires must be installed before sheet covering, and should be checked for smooth operating characteristics. The landing gear struts are formed of ⅛" music wire (make one right and one left) and J-bolted to the nacelle keel and main spar. The free end of each strut is lead through a hole provided in the rear spar. It will probably be necessary to cut away a small portion of each wing rib on the inboard side of the nacelle keels, to insure a firm mounting for each strut.

Medium soft, slash cut (check for flexibility parallel with the 36" length) sheet balsa, 1/16" thick is used to cover the wing. Each panel is covered separately from the nacelle keel inboard to the junction of the center section and outboard to the tip ribs. The covering must be firmly cemented to each rib and to the leading edge. Make a careful check throughout this procedure, to insure that no warps occur that may bring about some disastrous "didoe" on the first flight. The center section (as indicated on the drawings) should be left uncovered. Sand the entire wing to the final outline, and shape with 40 paper.

Cut the firewalls from a good grade of plywood and cement them to the nacelle keels. Notice how the keels and firewalls are keyed together—this should be done precisely or the joint will be weak and useless. Weldwood glue is strong and hot fuelproof and is recommended at this point.

Trace the nacelle outlines on soft balsa blocks and saw them to shape. Spot-glue the blocks to the nacelle keels and wing covering and carve to shape. This same operation should be repeated for the cowls.

After rough carving and sanding, the cowls and nacelles are removed and hollowed to the outline shown on the plans. Methods for cowl mounting are determined to a great extent upon the engines used and may be best left to the discretion of the individual.

Unless your hobby shop has something most of them don't, it will probably be necessary to get tanks of about 1 oz. capacity that would fit the nacelles and still be in a position to function. Note that the tanks are similar in size and shape, differing only in outlet tube design. The tanks should be secured to the nacelle keels with small wood screws, before installing the nacelle blocks permanently.

Although it is not mandatory, we would like to suggest that the engines be radially mounted for strength and simplicity. Brass "tee nuts" or similar fastenings should be permanently affixed to the rear of the firewalls (before installing the nacelles). Completion of the wing structure to this point will make it practical to begin work on the fuselage.

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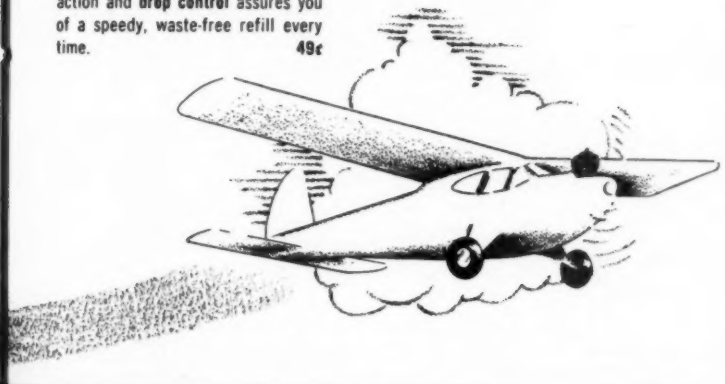

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After cutting out all the parts required, begin the fuselage assembly by joining the two sides with the formers. The upper, rear portion of the fuselage is planked with ¼" x ¼" x ½" wide soft balsa strips. The upper and lower nose blocks and upper cabin block should be roughly sawed to shape and cemented in place, then carved and sanded to the final outline.

Form the nosewheel strut from music wire and sew (with soft copper wire), or J-bolt, to the plywood nose former F-1. This entire assembly is then securely glued to the front of the fuselage and the small, soft balsa nose block added.

It would be advisable to join the wing and fuselage at this point. They should be very thoroughly cemented together to eliminate any possibility of an inflight "divorce." Don't forget to insert the pushrod in the bellcrank, or the controls may not function too well. The fuselage bottom sheet, and the soft balsa fairing at the leading edge of the wing center section, are now added.

The "tailfeathers" (rudder and stab) are cut out of medium-hard sheet balsa. The stab should be carefully tapered to the thicknesses shown on the plan. Join the stab and elevators with aircraft tape hinges (don't use crinoline or gauze). The control horn assembly must be thoroughly cemented to each elevator half, and the wire covered with aircraft tape or nylon, to make sure it stays put. Use plenty of cement when assembling the rudder and stab to the fuselage—working the excess around with a finger tip to form fillets. Their alignment should be carefully checked, and the rudder off-set about ¼". Hook the rear end of the pushrod thru the control horn and check the entire control system for freedom-of-movement and approximately equal motion, then cement the hollowed balsa tailcone to the fuselage, and the "dogwork" is completed.

You have now reached the second plateau—sanding! With progressively finer-grit papers, starting with no coarser than 40 and ending with 80, the entire structure must be sanded and sanded and sanded, until there ain't a lump or a bump anywhere. All cracks and/or depressions that may occur during this operation should be filled with Plastic Balsa and sanded smooth. In order to get a finish that will do a model justice, there is no substitute for sandpaper and elbow grease—so on and on until perfection! To protect the soft balsa from damage and to eliminate the fuzz, two coats of thinned, clear dope should be brushed on and lightly sanded to a stain finish.

Before proceeding any further, it would be advisable to install the windows and windshield. They should be carefully cut out of 1/64" thick clear celluloid and cemented to the fuselage. This operation should be done with care and precision. Nothing can mess-up the appearance of an otherwise beautiful model more than poorly fitted windows, or those with cement smeared all over. Before final finishing, they should be carefully masked.

The finishing stages of any model, where appearance is of major importance, should be carefully planned—well in advance of the actual operation. Primary and secondary colors (if any) should be chosen for harmony and some thought given to the final trim and striping. For instance: If red and cream (or white) is the combination selected, the exact outline each is to occupy should be determined. The sanding sealer and primer-surfacer should be light in color, because of the poor "hiding" properties of cream and white. The lighter shade of dope should always be applied first to eliminate "bleeding." Intelligent planning prevents a lot of unnecessary work!

It goes almost without saying that a sprayed finish will give the best results but if this is impossible, a good brush job with thin dope can be a credit to any model. Rather than go into a lot of tedious detail, we will list a minimal finish that will be adequate for most purposes and not add a lot of weight.

1. Four to five coats of sanding sealer, with a light sanding between coats, and wet sanding after the final coat.
2. Four to six coats of primer-surfacer, again sanding lightly between each coat and wet sanding after the final coat.
3. Eight to twelve coats of colored dope, thinned approximately 60% dope and 40% thinner. Sand lightly between each coat.
4. Striping may be best accomplished by carefully masking the outlines with narrow strips of masking tape, and pressing them firmly in place. To keep the striping dope from running under the edges of the tape, try brushing a little clear dope along the inside edges of the tape, using a fine striping brush. It only requires a few minutes but is well worth the effort.

The final appearance is best determined by the individual's requirements. If the model is to be flown in scale and beauty events, finish it as the competition requires. On the other hand, if your version is only for Sunday flying in the local schoolyard, the finishing procedure we have outlined will be more than adequate.

As a final note, before we leave the subject; to achieve that beautiful lustre the judges admire and the girls gush over

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(what's this?), rubbing compound is the answer! A thorough rubbing with a very fine grit compound, followed by several coats of wax, will really bring out those highlights.

Before flight, check out everything very carefully once again. Nothing looks sadder than a beautiful scale job scattered all over the cold, cold ground. The "310" should balance approximately 1" behind the leading edge at the center section. In no case should the balance point be aft of this—although it may go forward to the leading edge. Add ballast, as required, to bring the balance point in range. The original model needed nothing added (ain't we lucky?). The "310" handles well and stays out on the lines, so no trouble should be encountered if everything has been carefully done.

Corben Super Ace

(*Continued from page* 45)

simple task because there are no compound curves involved. Mount the landing gear before adding the stringers on the underside of the nose. Note too, that these stringers do not taper into the fuselage structure, but are cut off and bluntly rounded as on the real plane.

The engine cowlings look complicated, but if you make the upper and lower halves from soft blocks—lightly tack cement together—and then carve them to the side and top profiles of the nose, they are quite easy to make. The very top of the upper cowling is built up of sheet balsa as shown. The radiator tunnel is carved into the cowling after the cowl has been hollowed out to the lines indicated. I grooved the inside faces of the lower cowling about 3/32" deep to take the ⅜" ply firewall. As a result, the firewall was a tight press fit into the cowl so that it could easily be removed to change the thrust settings on the engine. Most any Half A engine with a long shaft may be used in this model. Just relocate the position of the firewall. I used a Cub .049B for power and cut away the inside forward face of the upper cowl to a thin wall so the engine would fit. The cowling is held together by tubes and grommets, (2 to a side), that make a snug fit when the halves are pressed together. The engine exhaust is carried away by the aluminum tubing exhaust stacks, while the intake air flows directly into the cowl behind the spinner.

Be sure to cover the fuselage sides, cowling and landing gear with tissue or Skysail to add strength and help fill the grain of the wood for a light-weight finish. The color scheme of the Corben may be as simple or as fancy as you desire.

The Corben in some states was licensed and carried license numbers—in others it was not licensed, so the license numbers are optional.

Adjusting the Corben for flying is not difficult. The model should balance at the CG position shown on the plan. You will probably have to put some clay in the nose to bring the CG to this point. Washers should be added behind the left engine lug to offset it for 2 degrees right thrust. Downthrust is automatic if you duplicate the firewall angle shown on the side view. Offset the rudder to the left about 1/32" for left turn in the glide and under power. By following these directions, if your model is built accurately, just remember that stalling in the glide is best handled by adding clay to the nose to shift the CG further forward. Do not take out of the wing incidence. Stalling under power is controlled by adding either a slight amount of side thrust or downthrust. If the glide turn is too tight, correct by adding opposite rudder. You will find that the Corben is an exceptionally stable and rugged scale model.

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Engine Review

(*Continued from page* 44)

opposition turns up with the same equipment. Should anyone get the idea that this relatively expensive engine is sold in a condition requiring considerable work to get in the money, let us hasten to say that it comes out of the box a potential winner; but in order to save the time of those who like the most from the least, the correct way to do the job is described, and useless work thereby avoided.

Every feature of the construction warrants detailed description and though it might be quicker to say "imagine one hot 60 with a small piston and you are thinking of a Fox 29R" there is actually a lot more to it, but you would not be far wrong dimensionally.

The crankshaft is high-quality steel, case hardened, and a full half inch in diameter with an extra high precision ball bearing at the inner end. Each bearing is noise tested as an indication of correct rolling action, and is identical with the inner bearing used in the best .60 racing engines. The crankshaft at a ¼" diameter is considerably beefier than in earlier Foxes and is balanced by a heavy counterweight which also damps some of the reciprocating weight.

A very rugged conrod, machined from dural bar, with bearings 5/16" long, takes the thrust from a case-hardened wrist-pin, which is tubular and fitted with brass end pads. The Meehanite piston, machined from bar, is milled out around the wrist-pin supports, and has a straight baffle in common with the standard engines. The skirt is not relieved and the wrist-pin bearings are 1/16" above the mid-length position, which, in conjunction with the long conrod, reduces piston side loads.

The cylinder liner is machined from a leaded steel having a low frictional coefficient, and a resistance to seizure under conditions of poor lubrication. Part of the unusual power derived from this engine is undoubtedly due to this quality, in combination with the self-lubricating properties of the Meehanite piston.

The permanent-mold casting of the crankcase is extremely interesting in many ways. At first sight, it appears as if no effort has been made to minimize the internal volume to obtain high pumping efficiency, since there is a lot of clearance between the crank disc and the piston skirt at bottom dead centre, and consequent dead space which, in conjunction with the large bypass passage, must give a low base-compression ratio. However, compression above or below the piston absorbs power, and there is a compromise between power gained from efficient charging, and power lost from achieving it, which will give the best performance at the crankshaft, where we want it. It is the old story of borrowing from Peter to pay Paul. You can get tremendous BMEP on paper, and in practice find that all the urge has gone into driving the supercharger. Duke Fox built some engines which had provision for varying the crankcase volume while running. He found the best value, and then designed the 29R crankcase accordingly. Since he apparently feels that piston friction is a major performance bottleneck, he has built the extra allowable dead space into the cylinder height, thus requiring a longer conrod which assumes a shallower angle at midstroke than a short rod, and consequently reduces piston side loading. It is contrary to all the rules and regulations, but the acid test is what gives at the end of the crankshaft,

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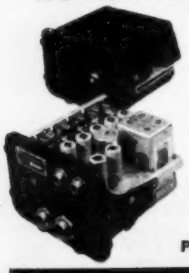

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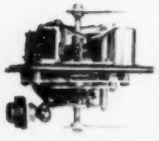

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and not, as it used to be, how many miserable milligrams extra it took to get it.

In addition to these measures for giving the piston an easier time, Duke Fox is almost unique in favoring the Desaxe, or offset, cylinder. It is much easier to machine a mold, and the casting itself and its jigs and fixtures, when everything is on a common centerline, and it is for this reason that the offset cylinder is so seldom seen. However, it has a number of theoretical advantages with no obvious reason for them not being practical advantages. The piston side loads can be equal on both power and compression strokes, thus reducing the maximum value as compared with a symmetrical setup, and the ports stay open longer, thus having the same effect as increasing their height, but without the usual disadvantage of reducing the effective stroke. Important to the modeler is the fact that the bypass does not steal half of one beam mounting lug, and as far as he is concerned the offset cylinder is more symmetrical than a conventional type.

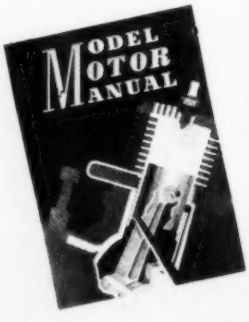
The air intake and crankshaft rotary valve port are no less than ⅜" wide by ⅜" long, and communicate with a 11/32" dia. gas passage. The air velocity through such large openings is so low that if the engine is mounted sidewinder, cylinder outwards, the centrifugal force at speed will throw the fuel out of the intake in opposition to the induction stream drawing it in; consequently the engine will starve and run erratically. A richer needle setting will not cure this trouble, and the best solution is to mount the cylinder inwards and so augment the induction. The reason for this behavior is that since the engine is designed exclusively for pressure fuel feed, there is no need to provide any venturi or restriction in the intake to create suction to draw the fuel from the tank. Volumetric efficiency and maximum power decrease as suction is increased. Therefore, with virtually no suction, a useful amount of extra power is made available. The many people who have increased the intake diameter of their racing engines have no doubt found that the extra power usually goes hand in hand with fuel feed difficulties, owing to inadequate suction, and that relocation of the fuel tank towards the outside of the flying circle is frequently necessary. The Fox 29R, therefore, takes advantage of this source of power, and the modeler is relied upon to lay out his fuel system accordingly. For speed and power duration, where a short run is required, a pen bladder tank, which provides a fairly high pressure, gives an almost constant pressure feed and no problems should be encountered, as long as the engine is not mounted the wrong way. However, when a longer run demands a fuel container of larger capacity, it will be found that finger stalls and toy balloons are capable of only a very low pressure and, consequently, the fuel feed is much more susceptible to attitude and centrifugal force. It is therefore very important to box in, or positively locate, tanks of the large and floppy variety, in a

(*Continued on page* 52)

Test
Plugs:—2-O.K. ¼ x 32 Long Reach as fitted.
Fuel:—Standard test: Supersonic 1000
Special test: 50% Nitromethene
10% Nitroethane
10% Methanol
30% Castor Oil
Running time prior to test: 1½ hrs.

IMPORTANT NOTE—Duke Fox reports that warm weather causes overheating of twin-plug engine. Owners who return a two-plug head to the factory will receive a one-plug head in exchange.

Bore: .738" Power prop	Stroke: .700" Fox .29 ('55) (SS 1000)	Weight: 7 ozs. Moir Fox .29 (SS 1000)	Fox 29R (SS 1000)	Fox 29R (Special Fuel)
10 x 8	11,500	12,000	12,100	12,200
10 x 6	12,400	12,800	13,000	13,150
9 x 8	12,600	13,200	13,350	13,500
9 x 6	13,700	14,250	14,400	14,600
8 x 8	14,050	14,600	14,800	15,050
8 x 6	14,800	15,400	15,750	16,100
7 x 10½	13,900	14,600	14,850	15,100
7 x 9	14,650	15,300	15,700	16,000
7 x 8	15,000	15,800	16,200	16,500
Top Flite				
10 x 8	10,400	11,100	11,250	11,350
10 x 6	11,500	12,000	12,200	12,300
9 x 8	11,650	12,350	12,500	12,650
9 x 6	12,700	13,250	13,400	13,650
8 x 8	13,100	13,800	14,000	14,250
8 x 6	13,900	14,550	14,800	15,050



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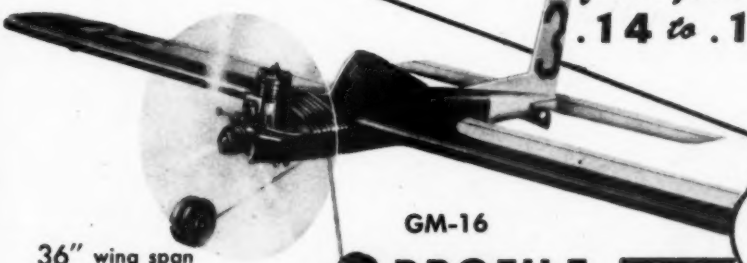

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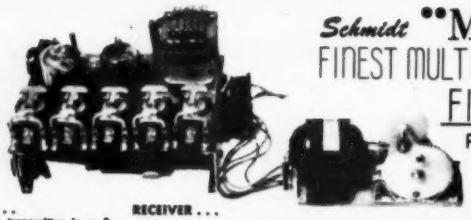

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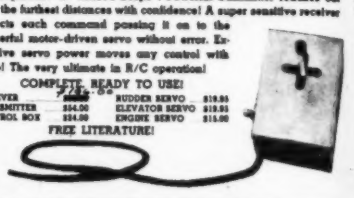

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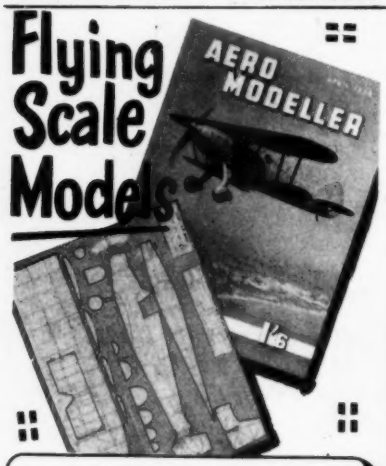

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positon similar to that necessary for a conventional stunt tank with the tank and jet centers in line with the aircraft in flying attitude. Those who have never used this type of fuel system before will be highly delighted with the rock-steady engine behavior arising from the elimination of frothing and pressure variation, and will quickly become reconciled to the untidiness of the installation.

Those who have two-speed control in mind should realize that much of this 29R performance is due to the fuel system, and that modifying the engine for two-speed operation will chop off the top of the power curve. Although with a properly designed intake the engine will undoubtedly still be outstanding, it is nevertheless a pure competition engine, and is best used in the manner for which it was designed.

The needle valve assembly is screwed into a boss on the center of the backplate, and does not communicate with the inside of the crankcase at all. It is simply mounted on the backplate. The valve body is provided with two connections, one pointing aft for bladder tank attachment, and the other at right angles for the fuel line which goes to the fuel spray nozzle in the intake. The way to use this layout is quite simple but must be carried out intelligently, if flooding and bad starting is to be avoided. The bladder is bound with thread or soft wire onto the needle valve, the needle is opened, and the bladder squeezed to exhaust all air, and the needle closed. The fuel line is also bound onto its connection, but is only slipped over the nozzle connection in the normal way. To fill the tank the line is removed from the nozzle, the end slipped over the nozzle of a fuel can pump, and the needle opened and the bladder pumped up with fuel. A certain amount of air will inevitably get into the tank and, after filling, the model should be held tail down to let this air rise to the needle valve. By opening the needle a crack, this air will escape through the fuel line, after which the line will fill up with fuel. When it is full, the needle should be closed and the line connected to the engine. It is desirable for a first time start to have the line full right up to the nozzle. The engine should now be primed through the exhaust and started. While it is running on the prime the needle should be gradually opened until the engine is running correctly. Because this is a pressure system, the needle will be found to be very sensitive and a little practice is necessary to find the right opening before the prime runs out. However the valve assembly is extremely well made and behaves logically and progressively. Once you have the knack the thing is easy. With larger, lower pressure tanks the needle will be less sensitive and more turns open will be needed.

The reason for having two glowplugs on the 29R is one of insurance against losing

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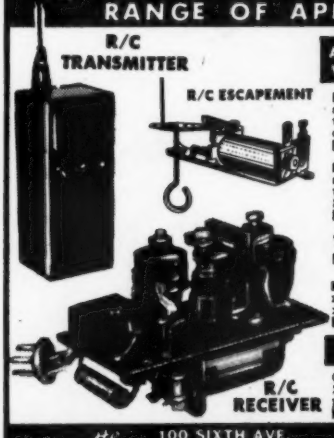

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out on a competition start because of a burned out plug. It is not necessary to use both or even have both in working order. For contest use they should be checked and then, after installation, it is a good idea to solder a piece of wire across the two center posts so that the battery leads only have to be connected to two places, ground and one plug. This doubles battery drain, but it is a lot more than double the insurance.

Since the two plugs screw into the head at an angle, their centerlines forming a V, their bottom ends are also at an angle with the flat-topped combustion chamber, so that one side of the plug is in a recess. Apparently it is advantageous to remove some metal from the center of the head so that the plug elements are not masked. The bottom of the plugs would then be flush with the combustion chamber surface. All this will be self-evident when you look at your engine, and is a tip from the designer. Another point mentioned by Duke Fox is that, unless the engine is thoroughly warmed up on the ground, there is a risk of the plugs cooling off in the air, owing to the slipstream. This is unlikely to become evident on the bench, but can be detected by irregular firing not unlike pre-ignition.

Pressure fuel feed offers an excellent opportunity for taking advantage of the slipstream to provide an air ram to the intake, as it will not effect carburetion materially with regard to mixture strength, and it will pack in a little extra air, the theoretical increase in power being about two percent at 100 m.p.h. The ram effect also helps to overcome induction resistance arising from the centrifuge action of the crankshaft in the front rotary valve.

Handling and Performance

To someone new to pressure fuel systems this engine can be expected to behave in an unusual manner, and one cannot therefore compare it with conventional engines as a measure of handling ease. However, the issue is simply one of getting used to something different which in every important way is a considerable improvement. The exercise of common sense, plus the awareness of two fundamentals, is all that is required to get reliable starting and performance. These two points to remember are; first, that when the needle is open, a fixed amount of fuel is going into the intake regardless of engine speed or whether the engine is running or not; and second, that you have a positive pressure on the needle at all times and therefore finer adjustment is required, with flooding being the most likely danger.

Comparison of the figures below shows the steady progress in the development of the Fox .29, and interpolating the figures of the 29R on special recommended fuel mix, for which the engine was designed, it appears that the gap between the earlier engines gets wider and wider as the RPM goes up. With 16,500 on the ground, 18,000 would be a normal estimate for operation in the air. However, since the power curve is apparently still rising steeply where our standard test finishes, it is probable that between 19,000 and 20,000 would be reached on 7 x 8 prop. The very large percentage of nitromethane in this mix would only really show at ultra high speeds in an engine having such good breathing equipment as the 29R, because at lower speeds the engine can get almost all the oxygen it wants from the atmosphere. An increase of 1,500 RPM over a standard Fox at the top end represents a very considerable increase in BHP, and even more is claimed to be available after carrying out prescribed polishing.

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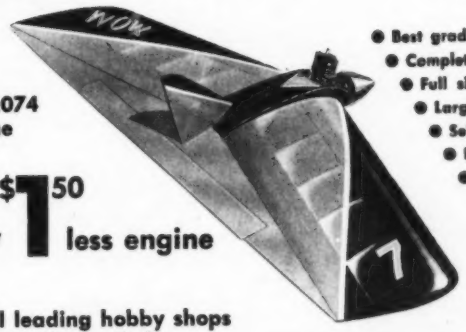

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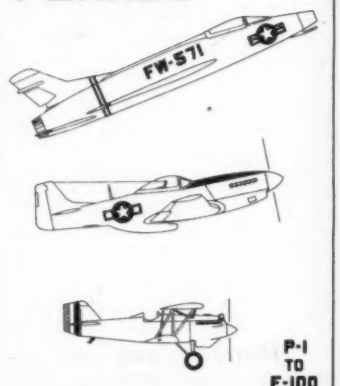

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This Is Multi

(*Continued from page* 17)

itself to be an excellent transitional ship. And also is capable of most of the stunt maneuvers.

Just a word here about the commercial radio equipment available. At this writing, there are several manufacturers supplying ready-to-fly 5-and-6-channel units. Among these are Badaco, Bramco, C.G., and Schmidt. The author has had most of his experience with the Bramco equipment and finds that it operates with great reliability. As a matter of illustration, over the course of hundreds of flights, both for sport and in competition, not a single mishap has occurred which could be attributed to either the receiver or transmitter. This is a statement not easily made by many of those familiar with single-channel operation. To be sure we've had our share of troubles, but they've always been traced to such things as servos, battery failures, wiring, or just plain pilot error.

One thing that should be done here is to punch a hole in that oft-repeated saying, "flying multi is like learning all over again." There are hundreds of multi fliers today who will deny that they had to learn from the beginning. True, there is an initial transition period one goes through when certain things seem a little strange and perhaps seem to be happening a little faster than they used to, but not to the degree that some would have you believe. One method of getting the hang of it is to simply put a padlock on your elevator controls until you get the experience with the rudder (and the altitude.) It then should be little different from a rudder-only ship except now you've probably got a stick instead of a button. Another and safer method might be to let an experienced multi flier make the first check-out flights for you, then turn it over to you *after* the necessary adjustments have been made. The reason for this is that with an experienced multi flier at the controls, he can often *prevent* a crack-up by skillful use of the stick. Once the ship has been adjusted properly, he can then turn the stick over to you (when it's high enough to be out of immediate danger), and let you begin to get the "feel" of it. Any mistakes you make can be usually corrected by the experienced man just taking over again. This way we've seen fellows learn to handle a multi ship after just a few flights. It's mostly a matter of overcoming a nervous feeling of doing something wrong. With someone around to help who knows what he's doing, the average person can get pretty good at it, after about 30 minutes on his own in the air. Landings might still make you perspire a little, but that's commonplace.

Probably the most difficult task in the beginning is to keep from over-controlling. Even with perfectly operating equipment, you must learn to anticipate the plane's actions just a bit. The amount of anticipation varies with different planes and comes by experience only.

One of the trickiest techniques to learn is how to steer a plane on the ground during a take-off. This applies more to a two-wheel type. On a take-off, remember that it takes more rudder control when the ship is still on its tail wheel. In this condition, there is often a time lag in response to the rudder. Once up on its two main wheels, it becomes much more responsive and the lag decreases. The tendency in both cases is to over-control and eventually ground loop. We have found a simple way of preventing this common occurrence. That is to hold the rudder

over in the *corrective* position until the plane shows the *first sign* of responding. At this time, go over immediately to opposite rudder and hold here again until the *first sign* of correcting itself, then to opposite rudder, etc. Actually, what you are doing is steering about one-half cycle ahead of the plane's movements. As you approach flying speed, the cycles increase in frequency until the last few quick beeps are no longer necessary as the ship is lifting and ready for just a little up trim to get it off. Be very cautious of giving too much up trim at this point. Some planes won't need any, but it is usually a good idea to start the take-off with just a little down trim so you don't get into the air before proper flying speed has been reached.

If you should vary more than about 30 degrees either way from your planned take-off line, don't attempt to straighten it out. This is usually most difficult after you've once strayed this far. Best to hit low speed, bring it back, and start over again.

(To be continued)

Home Made Servo

(Continued from page 29)

Wiring: It is important that only 1.5v be used as a power supply. This gives sufficient power to operate rudders on models up to about 54" span. If a larger model uses this type of control, it might be necessary to use a balanced rudder. The shim brass wipers 1 and 2 are wired through the relay as shown. In other words, when you are not transmitting, Wiper No. 1 is resting on circuit breaker A.

Action: Note that the negative supply runs from the negative terminal through the shim-brass wiper, to the pulley sleeve along the shaft, to the large gear wheel and through one of the wipers, depending on which one is energized, and also depending on the position of the relay.

The crank on my motor is arranged to give right rudder first. Therefore, on receipt of a signal the relay completes the circuit through to No. 2 wiper, the motor rotates under circuit breaker B, and breaks the contact. On release of the transmitter button, the relay returns to idle, thus completing the circuit through No. 1 wiper, and the motor rotates until circuit breaker A breaks the contact. In this action the rudder being on right, now goes through neutral over to left, and back to neutral again.

However, if you are holding right rudder, then release the button, and press it again and the rudder will stop on left. The action is: i.e. when you have right rudder on, then circuit breaker B is holding the motor stationary. When you release the bottom, the relay returns to idle and wiper No. 1 is energized, then the motor begins to rotate. However, as soon as you press the button again, then the relay energizes the circuit into No. 2 wiper and circuit breaker C comes around and breaks the circuit. Simple, isn't it?

Therefore, you have selective control in that you can have left or right rudder whenever you wish. Just remember that, if one press-and-hold gives right rudder, then press-release-press-hold will give left rudder. The unit may be adjusted to give left rudder first if so desired.

As stated before, only 1.5 volts should be used. I find one pencell sufficient. If 3 volts or more are used, this will give the motor sufficient momentum to swing right past the circuit breakers and not stop as it should.

It is imperative that all bearing surfaces

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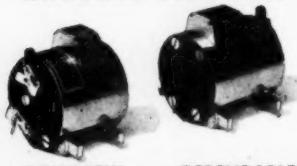

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should be clean and free from grease or oil. Thin piano wire may be used in place of the shim brass strips as wipers. Whatever you use, make sure that the wipers do not press too tightly against the large gear wheel or the sleeve of the pulley. The wipers should be just 'springy' enough to make a firm contact.

My unit, complete with one pencell and a 1¾" x 2" eight inch plywood base, weighs just 2¼ oz. If the servo is used in a larger model, or with large rudder area, use a balanced rudder to reduce the load on the servo.

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Model Air Capital

(*Continued from page* 13)

YMCA's, Armories, Auditoriums are scheduled and publicized so indoor fliers can get tuned up for the big contest in January.

In between meets, fliers and leaders are carrying on the battle for permanent flying sites, one of the most serious problems of the times. Active clubs also are conducting interesting meetings, using a Press-sponsored aviation film library. Leaders and members of the Cleveland Council of Model Aeronautics are always developing new sources for prizes and new sponsors of competitive events.

A year's activity is valued at more than $25,000 in prizes and promotional material. The printing and mailing alone—even though done on a low-cost basis through The Press—is nearly $5000. There are 20 valuable perpetual trophies, some dating back to contests of 1935, now in circulation, including individual high-point awards for all age classes in various contests and team awards.

Some 500 trophies are awarded here each year in the various events to winners who keep them permanently. Many other awards are made. About 12 top winners—including national champions—have won 100 or more trophies in competitions here.

But the firms and the people who pay for the prizes are thoroughly convinced it's for a wonderfully worthwhile purpose. In fact, the schedule of air meets and the intense enthusiasm of the fliers, is the hobby's best selling point and makes sponsorships easy to get.

The busy activity of an average year has inspired Cleveland Women's Chapter of the National Aeronautic Assn. to award an annual $500 scholarship to the top model flier who produces college entrance grades during high school days.

Among the most valuable prizes, too, are three pilot training courses totaling $500 in worth. They are for 12, 15, and 18 hours each, flying from one of the world's busiest airports, Cleveland Hopkins, where every minute is a concentrated course in air traffic control. These awards are presented to three highest scorers in the Navy Carrier Landing Contest of the Armed Forces Day Air Show each year. They are financed by American Steel & Wire Division of U. S. Steel Corp., and Richland Aviation, Inc., the flying school at the airport which provides the planes and instructors for winners.

Other important sponsors of model aviation events in Cleveland are: Cleveland Coca-Cola Bottling Co., Air Foundation, Cleveland Chamber of Commerce, American Airlines, Pan American World Airways System, Cleveland Aviation Club, Cleveland Council of Model Aeronautics, Cleveland City Recreation Division, Civil Air Patrol, Wing Scouts and Air Scouts, Cleveland Women's Chapter of National Aeronautic Assn., Garfinkel Shoe Stores, The Hobby House, Inc., Red's Hobbycraft

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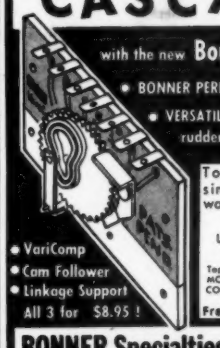

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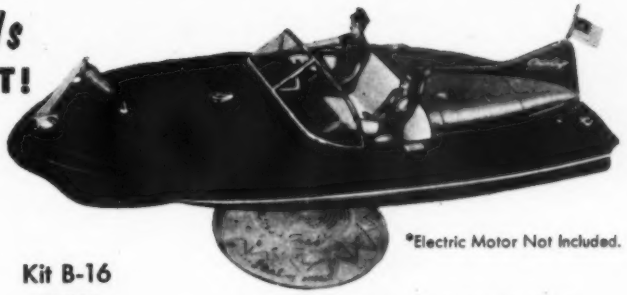

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To operate a program like this, it takes three essential items: 1—Good organization and promotion, 2—Sponsors and prizes, 3—Adult leaders and volunteer officials.

Within the good organization and promotion must come the salesmanship to line up sponsors, flying sites, and expenses for operation. In Cleveland this item is usually handled by The Press, largest daily newspaper in Ohio. It has been operating a "model aviation department" for 21 years, featuring a column on plane building and flying all that time on its comic pages. The feature now runs on Mondays, Wednesdays and Fridays.

This model aviation column has been pretty much the answer for Cleveland's outstanding year-around program. No other major newspaper in the world devotes such regular space to model aviation or any other similar hobby.

Unless a strong and active following existed, model aviation copy would have been dropped in favor of something else long ago. Today's model aviation column is the focal point of activities. It spreads the word about contests, meetings, etc. It provides a good reason for The Press to organize and promote air meets, since details and results of these make good "running copy" that fans, their relatives and friends, enjoy reading. This "sells" The Press.

The column gives beginners many hints and ideas for making better planes. It serves to give credit for outstanding performances to modelers, adult leaders, clubs, prize donors, sponsors and volunteer officials, encouraging all to move forward.

Cleveland's great army of volunteers and adult leaders who spend many hectic days every year in the midst of complex air meets are a major asset in carrying out a successful program. These range from top technical and aeronautical engineers at the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics, to a cute young lady of the Wing Scouts, just learning to operate a stop watch. Organizations like Cleveland Women's Chapter, National Aeronautic Assn., Air Force Assn., Cleveland Aviation Club, Civil Air Patrol, Air Scouts of Squadron Nine, Boy Scouts, Explorer Scouts, the Ninety Nines, and city paid recreation leaders, all participate in the Cleveland aerial parade.

Parlor Fly

(*Continued from page 34*)

is to be the inside curve. Cement hook and nose plug in place, reinforce it on both sides of the neck with 1/16" sheet. Cement nose plug lightly to body, for it may have to be removed to replace rubber motor. Rubber motor should be made from two 1/16" square, 1½" long rubber bands (the desk type). Now you can cover the elevator on the top side only. Rudder is now tack cemented to elevator in front only, to permit bending to correct adjustment.

Construct the other half of wing and, while this is drying, cover fuselage and cement tail assembly to it. Put wheels on landing gear and bend ends up to retain wheels. While half of wing is still affixed to plane while drying, place second half at desired dihedral and cement in place. Cover wings when cement is dry. NEVER wet tissue on wings or tail assembly—just fuselage. Do not dope covering as plane will bend like a pretzel. Cement wing on

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body, making sure it is setting straight. If instructions and plans were followed, the plane should balance properly.

Test glide it, with the rudder straight and wing unwarped. Although adjustments should not be needed, if it is necessary put a 1/16" square in-between the fuselage and leading edge of wing to increase lift to stop model from diving. If model stalls, cement weight to nose for a smooth glide.

If the plane is to be flown in a large room, then the direction of flight can be to the left. This will give a straight glide. If it is to be a small room performer, it is best to fly it to the right. Offset rudder to right and warp up frost edge at top of right wing.

From there on, it is trial and error. Even after you have it adjusted for sometime, you will still keep fiddling for a more accurate flight performance. That's what maintains your interest. For best results the flight pattern should be a fairly low take-off, about waist level. The plane should climb to ceiling level and then lose altitude. With no obstacles in the flight path you should almost be guaranteed four circles; with good adjustment you should be able to pull out eight to ten circles.

Profile Lightning

(*Continued from page* 18)

displacements can be installed within reason.

A profile is most simple and will give rapid results, reducing construction considerably. Construction is started with the engine pods and fuselage. The overall thickness of these members is ½" being built up from ¼" x ½" strip balsa, sandwiched between two sheets of ⅛" stock. Make reference to plans for proper positioning of sandwich material, hardwood engine mount and wing blocks. Cement and position these center pieces on one sheet of ⅛" outer covering. When dried, sand these assemblies flat, remove all irregular high points. Cement the ⅛" cover sheet in place, three in all, fuselage and engine pods. This method of construction will reduce weight considerably without loss of strength.

Having allowed sufficient time for the above parts to dry, proceed to finish them as shown in cross-sections. There are no sharp corners, all corners are full radii. Prior to setting this aside, rough cut-out the wing areas, allowing sufficient material for final trimming and fitting. Brush on two coats of clear dope.

Wing lay-up is next in line. Since this panel is not of the straight line design, but split at the root, proper steps must be taken to reinforce properly. After shaping the balsa leading edge, fasten the ¼" x ⅛" hard-balsa reinforcing member as shown. While drying, butt cement the 3" sheet balsa covering, both top and bottom, and taper fore and aft, to conform to plain lines. On the inside of the bottom covering, mark off the rib spacing, only one-half of the wing can be laid out at one time; the other half, when the first is dried. The ribs can then be placed and secured in position. Take notice of the rib thicknesses.

Since a profile design dispenses with any girth in fuselage construction, the 3" bellcrank is positioned in the wing, between fuselage and engine pod. A sheet of ⅛" x 4" plywood is cemented to the skin between the root ribs. Fasten the bellcrank to this lay-up. The lead-outs are 1/32" dia. steel wire, guided at the tips by plastic or aluminum tubing. Since the bellcrank will not be accessible later, now is the time to attach the pushrod. Where the pushrod

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comes through the bellcrank, solder a retaining washer to keep the rod from falling out; also be sure to leave sufficient wire length sticking out. When satisfied with operation of the controls, cover the upper surface of the wing. After shaping and sanding apply two coats of clear dope.

The next step is to fit the fuselage and twin pods to the wing contour. Once done, check for proper alignment, cement securely in place. Use balsa wood filler to patch where necessary. With this assembly drying, the tail surfaces can be worked out. Shape the tail plane using ¼" sheet balsa, include cut-out for the fitting of the elevator. Cloth hinges are employed, using a small Veco horn for the control lever. Cement this assembly on top of the tail boom, shaping the boom to properly seat the surface. While drying, fashion the fin and rudder from 1/16" sheet stock. In securing the fin to the boom, include approximately 5 degree off-set for each fin assembly to insure that the model stays out on the lines when flying.

Once the above work is behind us, all that remains is the engine fairing, and scoop blocks, all of which are shaped from scrap balsa. A hole of sufficient diameter, approximately 1¼", is cut in each engine pod to permit proper engine cooling. If Cubs are used, the needle valve will require extensions for proper engine adjustment. Prior to fastening the blocks, install two #5 Perfect fuel tanks as shown aft of the engine cut-out. The filler and vent tubing run to the top side of the pod. And now for the finish. Needless to say, all surfaces should be smooth and free of grain. To prepare the surface for color doping, fasten a sheet of Silkspan to all surfaces, after which brush on two coats of clear dope. Sand smooth, finishing with 0-0 wet grade paper.

To achieve a most attractive appearance, we chose a camouflage color scheme employing a light blue under surface, with olive drab and brown above deck. The photos and drawings indicate the separation lines for each color. After placing the decals and minor trim, apply two coats of fuel proofer.

With the engines in place, props and spinner mounted, check for balance, use the extreme wing tips for support. The nose should dip approximately 10 degrees. If not, add nose ballast until balance is achieved. Flying the P-38 differs slightly from single-engine models. A few steps to remember is to check the running time of the engines, setting the port engine (the one inside the circle flying counter-clockwise) to run a few seconds longer than its mate. Start the starboard (right) engine first. This will keep the lines taught and avoid a spin in. The model will perform well on 50' lines, using .015 to .020 lines, either wire or cable. Bear in mind that for lasting performance ballast the model for a 10-degree nose-heavy tendency.

How To Finish A Boat

(*Continued from page* 31)

alcohol-proof bar and table top finishes which are hot fuel (alcohol) proof. Fabulon is one example. Your local paint dealer can help you make a choice. Paste filler doesn't work too well on balsa for a mahogany colored hull. A better method here is first to use a mahogany stain to obtain the shade desired, then to use as many coats of Testor's Sanding Sealer as needed to achieve a slick surface. Two coats of hot fuel-proofer or clear butyrate dope will finish the job if a glow engine is being used.

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enamels (and even house paint, exterior grade) are a good choice. For a filler, a very thin white enamel or shellac can be used since the pores of the wood are smaller and closer together and require less filling. For plastic hulls, the synthetic enamels are a good choice with synthetic enamel auto primer used as an undercoat.

Before a stroke of paint or primer is put on any surface, that surface should be just as smooth as you can make it. You just can't get a slick paint job to cover a lumpy surface. All pits and cracks should be filled. If you are using butyrate dopes, Plastic Balsa can be used. If you are using nitrate dope or enamel, a filler can be made with balsa sanding dust mixed with a little clear dope. Plastic wood and similar products should never be used to fill balsa. It dries too hard and it is almost impossible to sand it flush without cutting away too much of the balsa around it. However, mahogany-colored plastic wood is available, and is just the thing for filling cracks and gaps in mahogany veneer and plywood. It can be stained and painted along with the base wood.

After all cracks are filled and gobs of cement cut away with a sharp modelling knife, the sanding should begin. My personal preference is to start with a small 2" x 3" piece of 3/0 Garnet Paper for the initial smoothing. As the Garnet Paper loads up, discard it for a fresh piece.

Next comes 6/0 Garnet Paper to bring the surface down until it feels really smooth. Then comes an idea borrowed from cabinet makers. It is to use a fairly damp piece of cleansing tissue to moisten *slightly* the entire surface being sanded. This will raise the little "hairs" of wood that have been pressed into the grain. Again with the 6/0 the "fuzz" is sanded off. One more treatment with the damp tissue and then the final smoothing with 8/0 paper. At this point, remove all wood dust with a soft brush or dry tissue.

Next step is sealing. In the case of boats, sealing means two things: first making the hull really water-tight and, second, forming a foundation for the color. The inside of the hull should be tackled first. For the typical balsa or mahogany kit boat, flow on at least six coats of sanding sealer, balsa filler coat, etc.

Sealing the inside should include the underside of the decks, both forward and side. If the surfaces are not sealed, water and water vapor can work up through the wood and ruin a good finish. A good dodge here is to pour two or three ounces of sealer right into the hull. Tilt and turn the hull so the sealer reaches all the areas that your brush can't reach. Pour the excess back into the bottle and use a brush to spread out the bit that drains into the bottom of the hull. Don't hesitate to add more coats of sealer if you feel the wood needs them for a complete waterproofing job. Don't depend on the color dope to do anything but *color* the inside. All sealing should be done with sealer.

For the outside of the hull, two different methods are possible. The first method calls for four to six layers of sealer each sanded right down to the wood. Next, half a dozen coats of sealer thinned 10%, sanding lightly between coats. Finally, enough coats (usually three to six) sanded wet to make the surface smooth as glass.

An alternate and much better method calls for three or four coats of sealer sanded right down to the wood with 4/0 Garnet Paper. Then cover with lightweight tissue using clear dope as an adhesive. This is followed with three or four coats of sealer, each coat sanded lightly with 6/0 then 8/0 Garnet Paper. The tissue helps cover up the pores and grain and does a job that

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would require at least twelve to fifteen coats of sealer. Whichever method you use, you are not ready to apply color until the surface is as slick as you can possibly make it. Stinting at this point can only cause trouble later.

Color comes next, and at this point it gets a little tricky in several departments. You can keep it from being at all tricky by sticking to one brand of dope for the whole job. However, you *can* use nitrate sealer (plain dope) for the sealing coats, and follow up with fuel-proof or butyrate dope, or even synthetic auto enamel. The rule here is that the nitrates can be used *under* the fuel-proof dopes and enamels, but *never, never,* over them. To make sure you don't run into trouble on this score, make test strips.

As you go along, coat small scraps of wood with the same number of layers of sealer and dope that you use on the boat. Then, if you have any doubt about the compatability of the type of paint you want to use next, try it on one of your test strips first. If it doesn't work on the strip, you've saved yourself from ruining a whole paint job. One place where this system is really a big help is trying different types of clear finish over different types of mahogany stains.

The lightest colors should always be applied first to prevent "bleeding." For example, a white hull with red bottom can be painted all white for the number of coats required to obtain a finished surface. The hull can then be masked and two coats of red will usually be enough to finish the bottom.

Flow on the first two coats of color just as it comes from the jar. Don't try to brush it out. Let it level itself and no brush marks will be there. After the second coat, sand with 320 wet or dry paper, or the new sand screen carried by most hobby shops and hardware stores. The idea here is not to cut through the color, but to smooth out any dust spots or air bubbles you may have missed. Thin the dope about 15-20% and brush on two or three more coats. As each coat dries, rub it down with wet or dry paper used wet. Be sure to wipe off the sanding residue with a damp, and then a dry tissue after each sanding. For a dull finish, the final two coats should be cut 50% with thinner and sprayed on and not rubbed down.

When it comes to spraying, you don't need an expensive compressor to do a good job. Most auto supply stores carry small touch up guns that work from a spare tire or from one of the cylinders of the car motor. Even simpler is a small "Flit gun." Or a mouth-operated sprayer available at art supply stores. A little care with any of these will produce results which equal that done with far more expensive equipment.

For a high gloss, the final coat can be rubbed down with Aero Gloss rubbing compound, Simonize Kleener or Dupont rubbing compound. After all rubbing compound is wiped off with a damp cloth and the painted surface thoroughly dry, a coat of paste wax should be applied and buffed to a high finish.

Boat cabins can sometimes offer a tricky job of finishing. For example, a balsa cabin top which is to be painted white or blue with mahogany coamings (sides) can be tricky. The best bet here is to stain the mahogany first, then use an amber color sanding sealer for both the balsa and mahogany. Then the top can be masked off, and color applied, and the job is finished.

A good idea in masking is to lay out a strip of masking tape on waxed paper or glass (a window will do) and cut strips with a razor-blade. Use the edge you cut for masking rather than the regular edge

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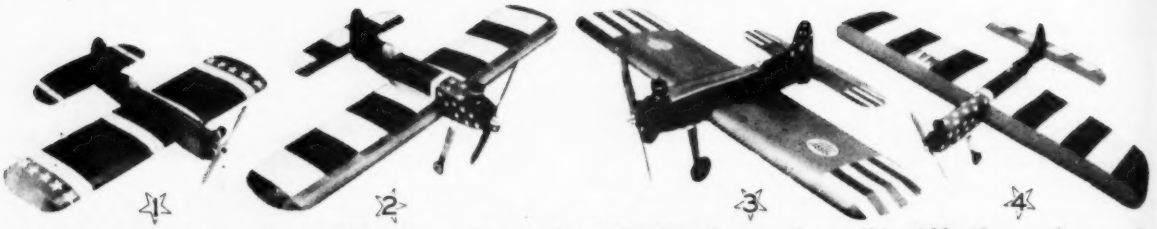

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of the tape. Seal the edge with a coat of clear dope to prevent the color from seeping under the tape, and the result will be a really sharp clear line.

Some boats have a narrow line of color called a "boot topping" between the side and bottom colors. The best way to apply "boot topping" is with a decal strip before waxing. Appropriate size strips can be cut from Trim Film decal sheets or if these are not available, try running a wide strip of gold lacquer along a strip of gummed Kraft tape. When the lacquer dries, the tape can be cut into narrow strips and handled just like regular decals.

The white lines on the forward and aft decks of some boats are best applied after the staining and sealing and just before the final glossy coats. It is almost impossible to make neat, straight lines with a brush, so try white dope in a draftsman's ruling pen. Each line will require your refilling the pen with fresh dope. Make a few practice lines on one of your "test strips" and *then* tackle the deck.

After all striping, decals, etc., are applied, a final coat of clear should be applied to seal all decals and trim. A good finish is a compound of three things: first, good materials; second, "elbow grease;" third, patience. Apply liberal quantities of these ingredients to the job and you'll come up with a finish that will be a pride and a joy forever.

Radio Control News

(*Continued from page* 28)

the mounted object to vibrate after absorbing the shock, can literally 'shake' the mounted object apart. The ideal shock resistant material in this case would be one which would absorb the shock but which would not allow the object to vibrate or spring back and forth after receiving the initial shock. Styrene foam, which is the rigid white foam material generally obtained in 5 & 10 cent stores, department stores etc, will take up the initial shock without a severe 'kick-back' or recoil. The air cells are crushed in the process. The next best material is the flexible foam plastic from which pillows, household mats, etc., are made. This plastic material will absorb shock but does not have the springiness of rubber, thus decreasing the recoil action. Last but not least, the relays which have their armature pivoted on a knife edge on the pole piece, with the armature being held in place only by the contact points and the armature spring, should be mounted so that the armature is parallel with the firewall. The base of the relay should be mounted forward of the armature so that a forward induced shock will do nothing more than press the armature against the pole piece.

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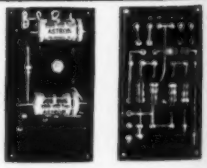
RADIO CONTROL WITH THREE PENCELLS



PERFORMANCE
45V & 22½V output from 4½V supply.
40V output at 4 ma load current.
Supply drain—20ma. no load; 60ma. full load.
2¼ x 1¼ x ⅝ in. WEIGHT ⅜ oz.

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Transformer core & bobbin	$1.50
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Parts available for 30V unit at above prices.	

When ordering specify output voltage desired.

B & S Products Company

Citizen-Ship Radio Corp., 820 E. 64th St., Indianapolis, Indiana, has now done with actuators what other companies have tried with the radio equipment itself. By this, we mean the addition of a small mechanical unit to their regular escapements, thus giving added versatility. This also means that your present SE or PSN escapement is not obsoleted for future use. The MSC, or Motor Speed Control, units sell for $3.95 at your dealers. For those wanting the complete package, $17.50 will buy you the MSC kit plus the SE and PSN escapements. This package will enable you to have a selective rudder control plus engine speed control, just the thing for the new single channel contests being held around the country.

A short time ago we mentioned the new Babcock 465mc equipment. We are now happy to anounce that they have full FCC approval on the transmitter. As usual, the Babcock 465mc gear is built to the highest quality standards and we predict that before the end of this current flying season you'll be seeing some unusual flying, due to this unique equipment. Incidentally, the receivers are light enough to be used in a Half A model and the receiver needs but one 30 volt hearing aid battery. While on the subject of the receivers, Dick Schumacher their consulting engineer, points out that due to the very high audio frequencies used, interference is practically non-existent. Battery voltage can drop from 30 to 20 volts and still give reliable operation. There are no tubes to break, since high shock resistant transistors are used. For those of you who have built Breezy, Jr., it has been found that a simple whip antenna is satisfactory for use with the 465mc receivers. We believe that this is the best news to hit the RC market since the FCC opened the 465 mc band. Here is an IMPORTANT point to remember when using 465mc equipment. Even though you have a license for 27.255, ANOTHER registration form MUST be filed with the FCC for operation on 465mc.

One thing we would like to point out at this time, is that the items mentioned in this column are as stated. By that we mean, if a unit has a particular current drain, it is given. For receivers, a low current drain would be in the order of 100 to 150ma, depending upon the number of tubes (filament). For escapements, a low drain would be anything under 600 ma, when operated on 3v. Many items are received by us which never get into print, merely because we do not believe the average modeler would be satisfied with them or because they have no bearing on RC work. We also try to present items that are of interest to the RC modeler, regardless of where they were made or where they are sold. Here again, we strive to present only those items which indicate they will be satisfactory during normal use. Sometimes an item is only casually mentioned in this column, with very little said about the performance. Later on we attempt to give a resume of test results. This applies mainly to actual radio equipment (receivers, transmitters and actuators).

The Micro-Motor, sold by Lafayette Radio, 100 6th Ave., NYC, is the first motor we've ever seen in the model field which has a professional look and a professional type mounting plate. About 1" in diameter and weighing 1.3 ounces, it has a no-load current drain of 225ma at 6v, although it will operate reliably on 3v. Selling for $5.95, this motor has replaceable carbon composition brushes and bronze bearings. Incidentally, this English motor has been approved by the British Ministry of Supply for servo and miniature drive work.

LATEST "CUSTOM MIDGET" RADIO

RECEIVER TUBE "IDLES" WHILE RELAY REMAINS IN UNENERGIZED STATE. (saving tube and battery)

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3-A-4 tube.....	1.00 ☐	0 to 50 Milliammeter...	2.75 ☐	Battery Tester, reads 0		4" x 5" x 3"...	$2.98 ☐
3-A-5 tube.....	1.35 ☐	Both Meters above...	5.25 ☐	to 2 Volts and 0 to		6" x 5" x 4"...	3.25 ☐
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Micro Switch...	.98 ☐	Z-9 Crystal.....	4.85 ☐	Electric Motor 6 volt		10" x 8" x 7"...	3.98 ☐
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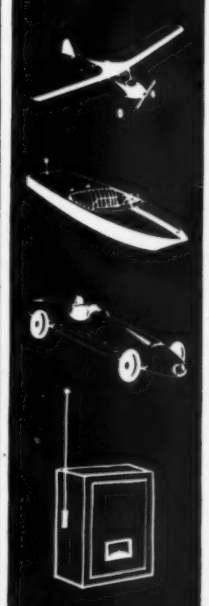

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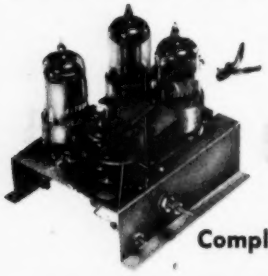

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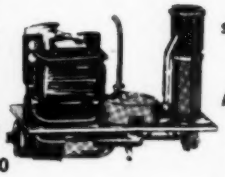

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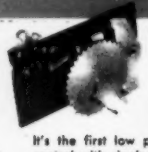

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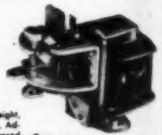

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Constructed of extra-tough high-impact plastic in brilliant color combinations. Equipped with new latest-design Thimble Drome *Babe Bee* engine with unbreakable spring action self starter. Rudder adjustable for straight course or circles. May be operated on a tether if space is limited.

15⅝" long. 8⅛" beam.
FULLY ASSEMBLED, READY TO GO **$9.95**
Produced under the exclusive Cox "Temp-Trol" process.

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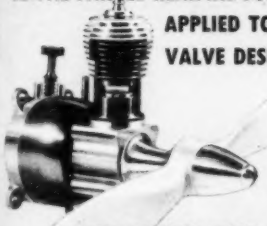
For Modelers Who Know Their Engines

COX ADVANCED REAR INDUCTION PRINCIPLE APPLIED TO ROTARY VALVE DESIGN



Thimble-Drome

RR1

FLUSH MOUNT REAR ROTARY .049

Here's rotary valving at peak efficiency! The SMOOTHEST engine you ever used—plus the advanced fuel induction, operating convenience, and protection of rear valve design. You'll say it's the first successful ½A stunt engine with tank. RR1 positively will NOT run backwards. No outside fuel lines. Mounts in any position. At all dealers.

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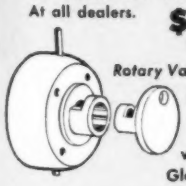

Rotary Valve and Tank Assembly

Designed for use with Thimble Drome Glow and Racing Fuel— pint 95¢

It isn't "as good as a Cox" unless it's made by

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Berkeley's Flying Scale designs have won 1st or 2nd in this e
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We are proud of this extraordinary re

1" = 1' Scale . . . For Free-Flight . . . Controline . . . or Rubber Power!
For .035 to .049 Engines Free-Flight . . . .049 to .099 Engines Controline (except as noted)

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PIPER "SUPER CRUISER"

35" Wingspan

Three place cabin monoplane originally introduced as the "Cruiser" in 1940 with 75 h.p. then as the "Super Cruiser" after World War II, with 104 h.p. and then in 1948 as the four place "Family Cruiser". "Super Cruiser" had a maximum speed of 115 m.p.h.

$2.95

1¼" Scale
37½" Wingspan

"BUHL PUP"

The "Buhl Pup" has been immortalized as one of the finest light planes ever designed. A number of full scale "Buhl Pups" are being rebuilt by "old timers". This truly different design makes an exceptionally realistic and fine flying model.

$2.50

CULVER "V"

29" Wingspan

This low-wing sport plane turns in long stable flights. The tricycle landing gear adds realism to landings.

Each Kit Contains:

- Authentic Multi-color Decals
- Formed Gear, Rubber Wheels
- Die-Cut Balsa and Plywood Parts
- Metal Hardware and Covering Material
- Full Size Berkeley Detailed Plans!

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STINSON VOYAGER "150"

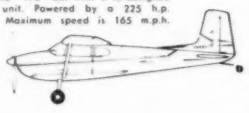
34" Wingspan

Originally built by Stinson division of Consolidated Vultee. Added to the Piper line in 1948. Four place 165 h.p. Franklin engine. 145 m.p.h. maximum speed.

CESSNA "180"

35" Wingspan $2.95

Four place cabin monoplane introduced in 1953 using the same wing as the "170" but with a re-designed fuselage and tail unit. Powered by a 225 h.p. Continental Engine. Maximum speed is 165 m.p.h.



COLONIAL "SKIMMER"

(Not for Rubber Power) 33½" Wingspa

The hull design is perfect for realistic water take-offs.

Three place amphibian with retractable landing gear. Nose wheel protrudes when retracted to serve as a bumper. Powered by 125 h.p. Lycoming, 125 m.p.h. $2.95

$2.95

CESSNA L-19 "BIRD DOG"

36" Wingspan

Two seat observation plane used on a large scale in Korean War by the U.S. Army and the U.S. Marines. A large number of these are used by National Guard units. Powered by 213 h.p. Continental—130 m.p.h.

$2.50

"AERONCA SEDAN"

34" Wingspan

Four place light cabin monoplane. Powered by 145 h.p. Continental engine. Speed—129 m.p.h.

Featured as a landplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular

$2.50

STINSON SENTINEL "L-5"

33½" Wingspan

Two place liaison and observation plane first flown in 1941. 1731 L-5's were built during World War II. Still in use by the U.S.A.F., Italian Air Force, and the Japanese Air Defense Force. Powered by 190 h.p. Lycoming. Maximum—129 m.p.h.—112 m.p.h. Cruising

$2.95

"SUPER CADET"

35" Wingspan

Known as the "Interstate Cadet" before World War II and currently built by Call Aircraft Co. Two place—power was 65 h.p. It is now stepped up to 125 h.p. with an increase in maximum speed to 135 m.p.h.

FAIRCHILD 24 "RANCHER"

36½" Wingspan

First produced in 1933 as a two-seater, in 1936 was introduced as a four place model using either a radial Warner engine or an in-line Ranger. Military version was known as the VC-61 "Forwarder" by the U.S.A.F. and the "Argus" by the R.A.F. Production resumed for business use after the war. 132 m.p.h.

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